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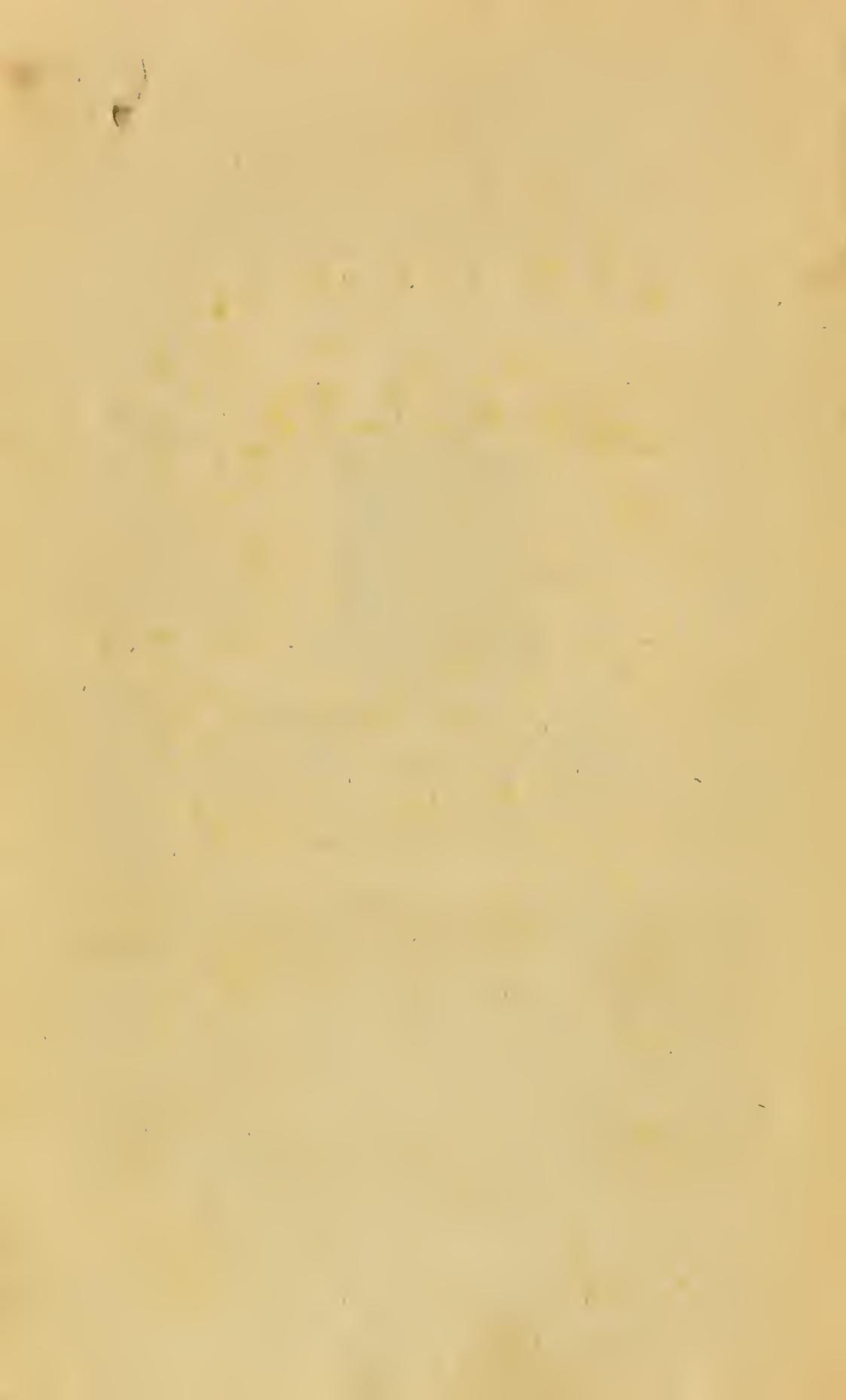
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A N
I N Q U I R Y,
INTO THE
S M A L L - P O X,
M E D I C A L A N D P O L I T I C A L :

W H E R E I N
A S U C C E S S U O L M E T H O D O F T R E A T I N G T H A T D I S E A S E
I S P R O P O S E D ,

T H E C A U S E O F P I T S E X P L A I N E D , A N D T H E M E T H O D
O F T H E I R P R E V E N T I O N P O I N T E D O U T ;

W I T H A N
A P P E N D I X ,
R e p r e s e n t i n g t h e p r e s e n t S t a t e o f S M A L L - P O X .

B Y R O B E R T W A L K E R , M . D .
F E L L O W O F T H E R O Y A L C O L L E G E O F S U R G E O N S , E D I N .

*Cujus rei non est certa notitia, ejus opinio certum reperire remedium
non potest. Verumque est, ad ipsam curandi rationem, nihil plus
conferre, quam experientiam.* C E L S U S .

L O N D O N :

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M. D C C . X C .

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TO THE

KING.

SIR,

EVERY well founded attempt to alleviate the distresses of life, or to promote the good of Your people, will be acceptable to Your MAJESTY, whose unwearyed attention to their interest and happiness, has been invariably expressed in every part of Your Administration.

That the voice of Your subjects, unites in this opinion, and that they possess a reciprocal affection, and a grateful sense of the blessings they enjoy under Your gentle Reign, was, in the past year, clearly evinced, by the deep distress in which a whole nation was plunged, during Your MAJESTY's late indisposition, and the unfeigned joy that filled every heart, upon Your recovery. The annals of time cannot present us with an event, that so universally interested the feelings of all ranks !

YOUR MAJESTY's gracious condescension, in honouring the following work with Your Patronage, cannot fail to give it weight and credit in the world ; and to draw the public attention to a subject of so much national importance.

THAT

[v]

THAT Your MAJESTY may long live for
a blessing to Your dominions, possessing
the hearts and affections of a free and
loyal people, and the encourager of every
design for the public good, is the sincere
prayer of,

Your MAJESTY's
dutiful subject, and
devoted servant,

EDINBURGH, }
JAN. I. 1790. }

ROBERT WALKER.

portable, is, the insensibility of the nation in general, to the common effects of small-pox contagion, in so far as it is professedly understood by us. We hear of hundreds, or of thousands lying under the disease in different cities, which we are ready to look upon as an unavoidable calamity, when, by a few simple precautions, great numbers of these might have been totally exempted from infection; for small-pox being a foreign contagion, unknown in the island till within these 600 years, there is no inevitable necessity for any person undergoing it; if we can avoid a near approach to the source of infection, we shall never be seized with the distemper; and in all cases of accidental infection, many lives may be preserved, by a proper method of treating the disease, who now annually perish by it.

From accounts of the distemper, handed down by the Arabians, and their manner of treating it by the cool regimen, we have no reason to believe this method of cure alone, could be more successful in the preservation of lives, than what occurred

curred in Sydenham's practice, or of any who follow him in the same plan of management. For though the cool regimen is of much importance in this, and every other acute distemper, it is, of itself, incapable of suppressing the violence of those symptoms that occur in all the bad kinds of small-pox ; this is evident, not only from daily observation, but from the continuance of mortality, even since the cool regimen has been universally adopted.

We have no information respecting the proportion of those who were cut off by small-pox among the Arabians. I am apt, however, to believe, notwithstanding their hot climate, fewer persons died by this distemper, than with us, owing to a particular method, which they, as well as the Bramins of Indostan, employed in preventing the secondary fever, of which some account will be given in the following sheets.

Inoculation is the only expedient that has been devised in Britain, for counter-acting the ravages of the accidental disease;

ease ; and it must be owned, the great disproportion of deaths which occurred in this way, compared with the prodigious numbers cut off by the other, afforded an encouraging prospect of its answering that end ; but the experience of near 70 years, has evinced the fallacy of this conjecture, as it appears from authentic evidence, the mortality has been constant during the above period, and that the disease proves as fatal now, if not more so, than before the æra of inoculation.

As the continuance, as well as the increase of mortality, which we have endeavoured to account for, does not arise from the inoculated, it necessarily must from the accidental disease ; and it is to be regretted, that while the *first* has for more than half a century engaged the attention, and employed the talents of medical men, little or no pains has been taken to enquire into the nature and most effectual method of curing the *last*. Great light has been thrown upon many diseases within the above period, but little or no improvement made in the cure of small-pox

pox by accidental infection, since the days of Sydenham, though infinitely more destructive to mankind, than any other distemper.

This consideration has induced the author, for many years past, to pay particular attention to the *worst kinds of small-pox*. The mild disease is in itself so simple, as scarcely to require medical assistance; but the annual mortality originating solely from the others, renders their investigation a necessary and interesting object, both in a medical and political light,

The mode of treatment in the cure of the worst kinds of small-pox, set forth in the following work, may properly be termed *preventative*, it being evident, that when the disease is left to nature, neglected in the beginning, or improperly treated, it often acquires such a degree of virulence, as to defeat our utmost efforts to counteract it; in this manner, it either terminates fatally, or, if through strength of constitution, it is protracted, it leaves the

the patient much disfigured, or reduced to a state of dangerous weakness. To obviate these consequences, a method of cure is proposed, of diminishing the morbid excess in the fluids, from the commencement of the disease, by which the violent symptoms are alleviated, the distemper in every stage brought more under management, the second fever mitigated, or altogether prevented, and the disease brought to a more speedy and favourable termination.

The *first* and leading object, therefore, in this publication, is the rescuing numbers of the human race from the jaws of death, who now annually fall victims to this distemper. And as the mortality from this disease, is even much greater in several of the European states, than it is in Britain; it is a pleasing consideration, that as the proximate cause of small-pox is the same in every region, so with very little alteration, the plan of treatment recommended, will apply with equal advantage to the inhabitants, both of the northern and more southern kingdoms of Europe,

Europe, as well as to those on the extensive continent of America.

The *second* extends further than the relief afforded to individuals; for, as far greater numbers of mankind are swept off by the small-pox, than by any other disease, and these, not the aged and infirm, but the younger part of every community; this loss comes to be an object of consideration to the public.

As the reduction of deaths occasioned by the accidental disease, is one chief intention of the following inquiry; the author considered his work incomplete, without an appendix, wherein he has endeavoured to point out different sources of infection, from whence a still greater reduction of deaths may be expected. If these different sources of infection and mortality are well founded, their importance, together with what is proposed for obviating their destructive consequences, claim the attention of every community, who ought to employ every rational method of preventing the spread of contagion,

gion, which will be found the most certain and effectual means of preventing mortality.

The author has advanced no theories, but what he has endeavoured to establish by facts ; and he considers his successful treatment of the disease, the best evidence of the truth of his theory.

As to the execution of this work, he will need much indulgence from his readers ; let it be considered, it was wrote in the intervals of business, and therefore will admit both of correction and amendment. He is abundantly sensible, the importance of the subject required an abler pen ; but if the hints he has suggested, were to rouse the attention of those in the medical line, who are possessed of more leisure and abilities, to improve a subject which not only tends to alleviate one of the greatest and most general calamities mankind are liable to, but by the reduction of a constant annual mortality, must necessarily increase population, he will consider his labours well bestowed.

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INTRODUCTION.

OF all the diseases to which mankind are liable, there is none that merits a more thorough investigation than small-pox, whether we advert to the constant annual mortality which attends that distemper, or to the disagreeable effects produced upon those who survive its ravages.

That small-pox has always been considered as a disease highly interesting to the public, is evident from the number of authors who have written upon that subject, since its appearance in Europe: Such as have had occasion to look into the long list of these, collected by Baron Haller, (and many volumes have been since published) may naturally conclude the subject to be quite exhausted; but every discerning per-

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son must be convinced, there can be little union of sentiment, where above a thousand people have written on one disease; and as such a number of learned men could never obtrude upon the world a recital of the same tale, of consequence diversities of opinion respecting the nature and cure of the distemper have obtained among them.

This diversity of opinion among medical writers, respecting a disease so common and familiar, must necessarily bewilder our mode of practice in the treatment of it; hence the manner of treating small-pox (if we except the cooling regimen lately adopted) appears to be more indeterminate than that of any other disease we know of.

Though the writers on small-pox are not agreed upon the most proper and successful method of curing the disease, they have from time to time thrown out many excellent hints concerning it. There are indeed phænomena attending this distemper, involved in so much obscurity, that in all probability we shall never be able to explore them; yet, from collating some well

well established facts, we doubt not but further light may be thrown upon it, and a more certain and determinate mode of practice pointed out, by which many of the worst and most malignant kinds of the disease may be cured with greater facility than they are at present, and of consequence the annual mortality arising from that depopulating malady may be considerably reduced.

It is certain, that great improvements have been made in every branch of physic, and in the treatment of almost every disease, within this half century; can we apply this well known fact to the small-pox? It would seem as if we had remitted any further enquiries into the nature and cure of this *intractable disease*, as Sir George Baker very justly calls it *, trusting wholly to the advantages derived from inoculation, the success of which operation seeming to have drawn off the attention of medical men from a more minute investigation of what is termed the natu-

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* Inquiry into the merits of a method of inoculating the small-pox, p. 4.

4. INTRODUCTION.

ral disease, from which the mortality chiefly arises ; hence most of the publications on that subject, for more than fifty years past, have either been in defence of inoculation, or in setting forth the most successfull methods of carrying it on.

We are of opinion, that very little additional light has been thrown upon the disease, produced by accidental infection, since the days of Sydenham, unless by carrying the cool regimen somewhat further than he did ; but though the cool regimen, and the application of cold air, is of high importance in the successful treatment of small-pox ; yet notwithstanding these improvements, if upon an average we find the same, if not a greater proportion of mankind cut off by that distemper now, than was above a hundred years ago, before the cool regimen was generally practised, we may justly infer, that the cool regimen of itself is insufficient to subdue the dire symptoms attending that disease ; and consequently during this long period, we have made no advance in reducing the great and constant annual mortality.

The

The truth of what has been now asserted, will appear evident, by looking into the bills of mortality. The successful cure of small-pox, or of any other popular disease, will be obvious by a reduction of deaths in these bills; but from the most accurate information we can obtain from them, it does not appear that the annual mortality has been lessened since the more general adoption of the cool regimen.

In most bad cases of small-pox, the progress of the symptoms are generally regular and uniform; notwithstanding of which, as we hinted above, the manner of treating the disorder has been more equivocal and undetermined than that of any other disease, even since we relinquished the hot regimen. Is this to be ascribed to the various theories that have been formed of the disease? To our not having properly ascertained its proximate cause? Or, to an expectation of more powerful effects from the cool regimen than it is capable of producing?

To put our present mode of treating the small-pox in the most favourable point of light, I shall admit Sydenham to be the

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standard of modern practice, whose works in general, and more especially the several pieces he has written on this subject, have long been held in the highest estimation, both by our own countrymen and foreigners. Indeed Sydenham, on many accounts, merits regard. He has given a distinct and accurate history of the disease, is the first who divided it into regular stages, and who had the resolution to pursue the cool regimen, in the midst of much prejudice and opposition; and what has not a little contributed to recommend his works to the world, is the sagacity and candour that so conspicuously run through every part of them.

But Sydenham practised above a hundred years ago, since which period considerable improvements have been made in physic, as well as in several branches of philosophy, which have thrown light upon many diseases that formerly were involved in darkness; besides, he was deprived of some advantages which we enjoy. The practice of inoculation, unknown in Sydenham's time, has undoubtedly cleared up some material circumstances in the disease;

ease; and by comparing the characters of small-pox, as described by him, with their appearance in the present age, we shall find a considerable difference in the general run of that distemper. That seasons have their influence in modifying the small-pox, is beyond a doubt; a severe winter, which naturally promotes the phlogistic diathesis, cannot fail to produce small-pox more highly inflamed; a hot summer and autumn readily dispose the animal frame, solids and fluids, into a more debilitated and resolved state. These very opposite seasons must occur in the same island; yet by the improvements of the present age, the influence of seasons are more effectually obviated, than they were a century ago. Among these improvements, a considerable change in our manner of living, as hinted by Sir John Pringle, by a more free use of vegetables, &c. merits our notice; but more especially, by persons of all ranks possessing larger and better aired houses, where the individuals of a family are not so much crowded together as formerly, and of consequence

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8 INTRODUCTION.

are rendered less susceptible of the different contagions that occur.

We may therefore be allowed to say, the general habit of the country is improved, and though daily experience shews it is impossible to evade the various contagious diseases that prevail in every part of the kingdom, and more especially in cities and great towns; yet the influence of some of these contagious diseases, is less hurtful at present, than they were an hundred years ago. The small-pox indeed continues to depopulate the country; but it is remarkable in the present age, we seldom meet with such malignant kinds of that disease, as Sydenham describes constitutional to the years 1670, 1671, and 1672, where the pustules were interspersed with large serous vesicles, which, upon bursting, discovered the parts beneath in a gangrenous state: Or what he terms the black small-pox of the years 1674 and 1675: Single cases of such kinds do occur from time to time, but we rarely now find these unfavourable symptoms, marking the general character of the disease, in particular seasons or places. We do not suppose, that

that any particular state or constitution of the air could induce these morbid appearances, but rather consider the habits of mankind in that period unfriendly to variolous contagion, which rendered the disease more universally malignant.

Considering, therefore, the times in which Sydenham lived, the general habits of the age, the opposition he met with, and the advantages he was deprived of, it is surprising he wrote so clearly, and practised so successfully, which shews him to have been a man of genius and uncommon abilities. At the same time, it is observable, that his peculiar notions, and strict adherence to the Hippocratic system, was a considerable bar in the way of extending his knowledge of small-pox, further than treating the different kinds, as they occurred, in a judicious manner, so far as the nature of the disease was then known.

Sydenham, in imitation of the Father of Physic, considers the history of diseases, and a close attention to the progress of nature, to be the most infallible guide to genuine curative indications; and imputes the small proficiency that has been made
in

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in the healing art, to the forsaking of Hippocrates, and the ancient method of cure founded on the knowledge of conjunct causes: In support of which opinion, he endeavours to shew, that the knowledge of remote causes, which engage the attention of curious enquirers, is both incomprehensible and inscrutable *, and that proximate and conjunct causes only can be known by us, and from these alone the curative indications are to be taken.

In this kind of reasoning, we have a mixture of truth involved in prejudice and obscurity, which, we are persuaded, he, as a man of genius, was incapable of adhering to. Man being an intelligent agent, we may, with equal success, attempt to stem the current of a river, as to bind up his mind from enquiries into the nature, causes, and effects of things, and from reasoning upon them: And who is ignorant of the many improvements that Physic has acquired, by the researches, observations, dissection of morbid bodies, collections of medical facts, and experiments,

that

* Prorsus esse ακαλαληπτες ac inscrutabilis. Præfat. ad Syden. Oper. p. 23.

that have been brought to light in the course of the present century?

Dr Sydenhan considers theories in physic to be vain, and that it is fruitless labour to search for the remote cause of diseases, because they are inscrutable; yet he gives a kind of theory of his own, which is by no means satisfactory. He thinks it highly probable the small-pox did not exist in the days of Hippocrates, otherwise he would have given us a better description of that disease than any of his successors: ‘ Quo ‘ circa opinari mihi fas sit, morbos certas ‘ habere periodos, pro occultis illis atque ‘ adhuc incompertis alterationibus, quæ ‘ ipsius terræ accidunt visceribus, pro varia ‘ scilicet ejusdem ætate ac duratione; ‘ quodque sicut alii morbi jam olim exis- ‘ tere, qui vel jam occiderunt penitus, vel ‘ ætate saltem pene confecti exolevere, et ‘ rarissime comparent, (hujusmodi sunt *Le-* ‘ *pra*, atque alii fortasse nonnulli); ita, ‘ qui nunc regnant, morbi aliquando de- ‘ mum intercident, nobis cedentes specie- ‘ bus, de quibus nosne minimum quidem ‘ hariolari valemus,’ &c.*.

But

* Sydenham. Oper. p. 241.

But we are not left to such vague and uncertain conjectures ; for, tho' we may never be able to trace the origin of small-pox, we have the clearest evidence of that disease being propagated by contagion, and therefore we have no rational probability of its wasting with age. Physicians are now convinced, it is of the greatest importance and utility to mankind, to be acquainted with the remote cause of diseases. We know some of the most malignant to originate from specific contagions, some from human effluvia, and others from marsh miasmata. The history of our own country, of Egypt, and of ancient Rome, confirm this truth. A familiar example of the last of these sources of infection, will illustrate its genuine effects.

Conversing, one day, with a gentleman of fortune, and a searcher into nature, upon the pernicious effects of the vapour arising from marshy grounds, he told me, he knew the truth of it experimentally ; for, walking abroad one morning, he observed a small concentrated mist, or thick vapour, arising from the low part of a marshy

marshy field at some little distance. Curiosity led him to the spot, to know if it had any particular smell; the result of which was, his being immediately seized with a cold shivering fit, which was succeeded by ardent fever, and carried off by a plentiful perspiration.

The knowledge of remote causes being slighted by Sydenham, deprived him the pleasure of more real philanthropy, than he could possibly enjoy by the most assiduous attention to his small-pox patients; as, from the knowledge of the remote cause, it is far more easy, more useful to mankind, and a much greater acquisition to physic, to prevent a disease, than to cure it.

Whatever theories we adopt, in respect to diseases, these must necessarily influence our practice in the cure of them; and this observation is no where more conspicuous, than in Sydenham's practice in the cure of small-pox. He justly observes, that immediate causes only, lead directly to the proper indications of cure; but notwithstanding his extensive practice, and the great knowledge and experience he must have

have acquired in the treatment of this disease, his view of the proximate cause is far from being distinct, as he still continued an attentive observer of the progress of nature, and followed her implicitly in every step. But it must appear evident to those who have had the most extensive practice in small-pox cases, that there is no one disease more aggravated, nor one which more frequently terminates fatally, than this, when left to nature. A practice of this kind indicates uncertainty, respecting the immediate cause. Thus Sydenham points out certain symptoms, which he considers as essential to small-pox; and, therefore, is at much pains to foster and promote them, whilst, at the same time, he cautions against the danger that attends the continuance of these very symptoms. To give an example of this, he views a swelling of the head, face, and fauces, accompanied with ptyalism, not only to be common, but necessary symptoms in the confluent small-pox of adults; in consequence of which, we find him at great pains, both to support the swelling, and promote

promote the spitting ; and nothing is better calculated for these purposes, than his favourite medicine, the syrup of poppies, by the frequent use of which, he effectually prevented nature from taking any other channel for her own relief, which, we are persuaded, she would often effectuate, was she not restrained by our officious labours. It is amazing, that the many monstrous objects this sagacious physician witnessed, did not lead him to consider, whether these ugly symptoms might not be obviated, or at least so moderated as to render them less dangerous in the issue. The knowledge of the proximate cause ought certainly to have led him to make such an attempt.

I have dwelt the longer on Dr Sydenham's theory of this disease, and the practice he founded upon it, in order to shew, that notwithstanding the esteem his works are justly entitled to, and though his pieces on the small-pox contain many valuable observations, and are generally considered as the most complete standard of practice; yet

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yet if the above observations are just, it must appear evident, that he is not a perfect pattern to copy, in his treatment of this disease, and that by following out his method of cure, we shall never be able to reduce the mortality by small-pox, which is the leading intention of this Inquiry.

C H A P.

C H A P. I.

First Accounts of the Small-pox, and Opinions concerning its Origin.

IN what age, or country, the small-pox originated, is a question which in all probability will never be brought to any satisfying solution; nor would the knowledge of this curious circumstance, be of much importance to mankind.

It is evidently a contagion of its own kind, which originated from an unknown source; but we have no reason to suppose the disease was ever generated in the same way, as from long experience, we may be satisfied, the first subject of small-pox, was capable of infecting a whole nation, and of spreading the contagion to remote countries.

We are indebted to the Arabians for the first accounts of small-pox, among whom

whom the disease appears to have been common, and who were the means of spreading its infection through the different kingdoms of Europe.

Rhazes was one of the first and best writers among the Arabians ; he was a Persian by birth, and practised physic at Bagdat. His treatise on the small-pox, was translated from the original Arabic, by Dr Hunt of Oxford, at the request of Dr Mead, and is subjoined to his book on Small-pox and Measles.

Both Rhazes, and Avicenna, another writer of note among the Arabians, give an accurate and circumstantial history of the distinct and confluent small-pox, with their favourable and bad signs. The method of cure adopted by them, and in which they were followed by other Arabian writers, appears to be judicious ; they recommend the antiphlogistic regimen, such as bleeding, cool air, acidulous fruits, spring water, or water cooled with snow, and butter-milk ; they direct the body to be kept open with juice of prunes, &c. ; and, in general, though not strictly, forbid the use of animal foods, oil, butter and cheese ; and

and recommend vegetables of the cooling and subacid kind.

Rhazes informs us he was the first author who treated expressly of the small-pox; though in a large work, which bears the title of his Continent, he speaks of one Aaron, who practised as a physician in Alexandria, about the beginning of the sixth century, the period when the Arabians over-run the whole country of Egypt, and probably brought the disease with them. The learned Dr Mead says of this Aaron, ‘*Is Alexandriæ natus, Ma-
‘ humede imperante, anno DCXXII, medi-
‘ cinam exercuit* *’. Hinc conjicit doc-
‘ *tissimus Freindius in Ægypto, fortasse pri-
‘ ma exordia habuisse variolarum morbum* †.
‘ At paulo antiquorem originem ejus re-
‘ perit. Vir Arabice doctissimus, *Johannes
‘ Jacobus Reiske*, qui in veteri codice Ara-
‘ bico manuscripto Bibliothecæ Leidenfis,
‘ hasce verba selegisse dicit: *Hoc demum
‘ anno comparuerunt primum in terris Arabum
‘ Variolæ et Morbilli* ‡. Annus autem ille

B 2

‘ erat

* Vid. Abulpharai Histor. pag. 99.

† Oper. pag. 330.

‡ Disput. inaug. Lugduni Bat. MDCCXLVI.

‘erat post Christum natum DLXXII, quo
‘natus est ipse Mahumedes *.’ But though
Aaron is said to have written on the small-
pox and other diseases, yet as his works
are lost, we must refer the first account of
this disease to Rhazes, who wrote about
three hundred years after, or in the nine
hundredth year of the Christian æra; by
which account, if just, it is not yet a thou-
sand years since the disease was heard of
with any degree of certainty.

It seems now to be universally agreed,
the small-pox was unknown both to the
Greek and Latin writers: Rhazes indeed
supposes, that Galen alludes to it, under
the name of Carbo Pestilentialis; Dr
Hahn was of the same opinion, which was
disproved by Werlhoff 1735; and the Vari
of Celsus, have not the least resemblance
to it. Indeed the Greek and Roman
physicians were generally so minute in
their description of diseases, it is impossible
they would have omitted the history of
one so remarkable, had it existed among
them. It gives some credit to the above
account.

* De Variol. pag. 3..

account, that although the Romans extended their conquests over Egypt, Greece, Syria, and part of Asia, long before the commencement of the sixth century, and this infectious disease never appearing among their troops, was a plain evidence of its having no footing in these countries at that time, and renders the probability stronger of its being brought into Egypt by the Arabians.

The burning of the Alexandrian library, forty-eight years before the Christian æra, and the total demolition of it, six hundred years after, by the irruption of the Saracens, no doubt deprived the world of an inestimable treasure of knowledge; yet, from what has been observed, the history of small-pox could be no part of the vast collection of manuscripts that were destroyed, the disease at that time being unknown in Egypt, or any part of the Roman empire.

How long the small-pox had prevailed among the Arabians, cannot be determined; it is somewhat extraordinary, that a disease so contagious, should have been confined to their own tribes for any con-

fiderable time, and not have spread into neighbouring countries. This can only be accounted for, by the little intercourse these people had with the nations around them. By all accounts, they were a barbarous and ignorant people, and much separated from other nations by impassable desarts, so that while they continued in that state, they had no opportunity of communicating the disease to others.

As the Arabians extended their conquests, they gradually emerged from a state of barbarity, and began to cultivate the sciences, particularly physic; and they were encouraged in this, and different branches of literature, by some of their Caliphs, who collected many writings of the Greeks, and other nations, and had them translated into their own language; insomuch, that for five or six centuries, the arts and sciences seem to have forsaken their old masters in Greece, and to have taken up their residence with the Arabians.

From the uncivilized state of the Arabians, before the extension of their conquests, we could not expect to derive any information respecting the origin of small-

pox,

pox, however common among their tribes. Rhazes seems to consider the disease as natural and necessary to the constitutions of mankind ; and as his works were in high reputation with his countrymen, upon his authority, most of them entertained the notion of its being coeval with the human race ; yet however repugnant this sentiment may be to the experience of the states of Europe, where the disease was not generally known till near the end of the eleventh century ; this opinion was revived within these fifty years by Dr Hahn, and published in his *Ratio Variolarum, &c.*

Though the Arabians by reason of their remote and secluded situation, had little intercourse with other nations, it appears they carried on a small trade with India ; but whether they carried the small-pox there, or received the contagion from that country, is not so clear. The learned Dr Friend suggests an idea of the probability of the Arabians having derived this infection from some of the more distant regions of the East, and later writers seem to favour this opinion.

Mr Holwell, a gentleman of respectable rank and character, who resided long in India, and some years ago published a judicious account of the manner of inoculating for the small-pox in that country, takes particular notice of this observation of Dr Friend's, and confirms the truth of what he suggested, in the following words :
‘ The sagacity of this conclusion, later times and discoveries have fully verified :
‘ At the period in which the *Aughtorrah Bhade* scriptures of the *Gentoos*, were published (according to the Bramins, three thousand, three hundred, and sixty-six years ago), this disease must then have been of some standing, as those scriptures institute a form of divine worship, with *poojabs* or offerings to a female divinity, styled by the common people, *Gootee ka Tagoran*, the Goddess of Spots, whose aid and patronage are invoked, during the continuance of the small-pox season, also in the measles and every cutaneous eruption, that is in the smallest degree epidemical. Due weight being given to this circumstance, the long duration of the disease in *Indostan*, will manifestly appear ;

‘ appear; and we may add to the sagacious conjecture just quoted, that not only the *Arabians*, but the *Egyptians*, also, by their early commerce with *India*, through the Red Sea and *Gulph of Mocha*, most certainly derived originally the *small-pox* (and probably the measles likewise) from that country, where those diseases have reigned from the earliest known times *.’

The above account receives additional credit, by a similarity of practice in the cure of this disease, observed by the East Indians and Arabians, which it is probable these last could only gather from the example of the Bramins; for, besides the cooling regimen employed by both, their constant attention to the puncturing of the ripe pustules, is a strong presumption of the Arabians borrowing this usage from the Indians: most of the Arabian writers take notice of this; Avicenna observes, ‘Quando egrediuntur Variolæ cum compimento et pertransit septima, et appareat in eo maturatio, tunc necesse est, ut rum-
‘ pantur

* Holwell’s Account, &c. p. 6, 7, 8.

‘ pantur cum facilitate cum acubus de auro,
‘ et auferatur humiditas cum cotto *.’

History is silent respecting the precise time the small-pox first appeared in Britain; which is not to be wondered at, considering the universal ignorance which overspread Europe for many centuries. It is reasonable to think, that as the Arabians brought the disease at first into Egypt, so they introduced it into every country where they pursued their conquests; a great part of Spain submitted to them in the seventh century; and in the twelfth Avenzoar observes, the disease was so general, that few or none escaped; it was about this period, when the confederacy of the Christian states against the Saracens took place, for the recovery of the Holy Land, and this seems to have been the great source of spreading the small-pox through the different nations concerned in these exploits. John of Gaddeston, an English physician, speaks of the disease being common in Britain, about the end of the twelfth century; and we hear little more

* Avicenn. tom. II. lib. iv. sen. I. cap. 10. p. 75.

more of it, till about the middle of the last, when several men of eminence in the profession, wrote upon it. Whether physicians, at that period, were acquainted with the writings of the Arabians, or imagined the difference of climate required a different method of cure, it is evident that most of them adopted the hot regimen, until the days of Sydenham, who discerning the pernicious consequences of this treatment, boldly ventured to deviate from the general practice of his contemporaries, and had the credit of introducing the antiphlogistic regimen, by which he incurred a torrent of popular prejudice; and although this plan of treating the disease, was not universally adopted for more than half a century after his death, yet he certainly paved the way for the general mode of practice which now prevails.

C H A P.

C H A P. II.

Remote Cause of Small-pox.

THE small-pox being unknown in Britain, till within these six centuries, shews that it must have been imported from another country ; and the history of the disease, so far as we can trace it, the experience of mankind, our being able to avoid the infection, or to induce it when we please by inoculation, puts it beyond a doubt, that its remote cause is contagion.

The idea of small-pox being contagious, has in former times, probably, laid the foundation of what is called the hot regimen ; and afterwards, from a conviction of the pernicious consequences of treating the disease in this way, led some judicious writers either to pass over, or to deny its remote cause to be contagion ; but we are not to deny a self-evident fact, because it has been abused by prejudice, or false hypotheses ; it is bad reasoning, because many have suffered from a mode of treatment, intended

intended to expel what is called the virus of small-pox, that therefore the disease does not arise from contagion. The expulsion of variolous matter from the system, is not our province, but the work of nature ; and the means that have been employed for this purpose, *viz.* heating medicines, cardiacs, and close confinement, could not fail to exasperate the disease, and increase its mortality ; it is a happiness to mankind that this mode of treatment, is now almost universally laid aside.

Among the authors who pass over, or deny small-pox to be propagated by contagion, are some respectable writers of the French nation, who seem to consider the disease merely as an inflammation, *sui generis*; which opinion, though partly true, is not expressive of its distinguishing characteristic. The history of the disease, as well as daily experience, furnish us with the most undeniable proofs of its contagious nature, which is not a property of any disease simply inflammatory. It is not surprising, however, to find this opinion prevailing among the writers of that nation, some of whom deny the plague to

to originate from contagion, but consider it as arising from the long use of bad or corrupted foods *. It is certain that pestilential diseases have frequently occurred in consequence of famine, but we have no authenticated facts to shew, that famine of itself did ever propagate the plague, a specific contagion.

The notion of considering the small-pox merely as an inflammation, has also been adopted by some English writers, from whom, for brevity, we shall select one, who in other respects has given several good hints concerning the disease †.

That

* Observations sur la Peste du Marseille.

† The small-pox being an inflammatory disease, it is most certain, that the body must be disposed to receive an inflammation ; and whatever cause hath power to induce an inflammation, may possibly produce this species of inflammation. The disease then may be produced from violent exercise, change of air, particular climates, drinking spirituous liquors ; for these causes, productive of inflammation in those who have had the distemper, also produce the small-pox instead of such inflammation, in those who have not had the distemper. History proves this to be true, daily observation still confirms it the more. Who has not observed, that hard drinking, change of air, violent exercise,

That inflammation accompanies the small-pox, is beyond a doubt; and it will appear in the following chapter, that the inflammation excited in every pustule, is an effect of the variolous particles. These particles, therefore, must be considered as the remote cause of the disease; and though the doctrine of morbific matter has been very improperly applied to many diseases, both in respect to the theory and practice of physic, yet its actual existence and operation in the small-pox is demonstrable.

It is evident, that the morbific particles of small-pox must be received into, and operate upon the system, before the disease can be produced, without the intervention of which, the different causes adduced by this author, could no more give existence to small-pox, than barley sown in a field, could produce a crop of wheat.

We admit, that many have been seized with small-pox, soon after excess in eating,

cise, have not produced the small-pox in some subjects, and not in others; the reason of which is, I must confess, as yet inexplicable to me, and will perhaps be a secret for ever to others. *An enquiry into the origin, nature and cure of the small-pox, by Dr Thomson,*
p. 39.

ing, drinking, violent exercise, or change of air; but we have no reason to imagine, that any of these causes, or the conjunction of all of them, could, of themselves, produce small-pox: these sometimes prove occasional and exciting causes, accelerating and greatly augmenting the disease; but without previous infection, it is impossible that any person can be seized with the distemper.

In the same way (as exciting causes) we apprehend that bad grain, corrupted or improper foods, have often proved the source of epidemic malignant fevers, and other diseases of that kind, from the great degree of debility induced upon the system, by a long continued use of such foods. People in these circumstances, are not only more susceptible of every contagious disease that occurs, but these causes act with a double violence on subjects reduced to such a state of debility.

To conclude this argument, none will doubt that the inhabitants of this country, or those of ancient *Rome*, used violent exercise, and made a free use of strong liquors, &c. nay, were subject to some highly

highly inflammatory diseases ; why not then to the small-pox, seeing if these are the mediate causes of that distemper, they must necessarily produce their proper effect ? The reason is obvious, we have no where read of this contagion being introduced among the Romans ; nor into Britain, till the close of the twelfth century.

Besides, do not particular cases of small-pox frequently occur in practice, especially in children of weakly habits, or hurt by early and injudicious bleeding, where the patient sinks in the stage of eruption ? In such cases, we have examples of the patient suffering, from the want of a proper degree of fever or inflammation, necessary to the eruption of the pimples ; and if we are not able to supply nature's defect, in rousing the languid circulation, by cordials, &c. we must infallibly lose our patients..

C H A P. III.

Apparent Properties of Variolous Contagion.

IT must appear evident, that we can obtain no light into the principles of Variolous Contagion *a priori*; and as abstract reasoning upon this subject must be extremely fallacious, we propose to draw what information we can, respecting its nature and properties, from its common and obvious effects on the human body.

From the consideration of this contagion producing no pernicious effect upon those who are not susceptible of the disease, we have no reason to think it possessed of those virulent and deleterious qualities which have been ascribed to it by some physicians *, and which has led others to attempt

* I take this virulent substance to consist of rigid, infrangible, and unaltered atoms, so subtile, pointed, edged, &c. as to be *toto genere*, and wholly destructive to the blood and solids of man.

Fuller's Exanthemata, p. 179.

tempt its destruction, and to counteract its poisonous effects when received into the body, by the application of certain antidotes*. It will appear in a subsequent part of this work, that without a predisposition in the habit, variolous contagion neither can take place, nor can the smallest injury arise to the constitution from its reception. We have evidence of this, in those particular habits that resist the contagion, though living in the midst of it, who are incapable of being infected, tho' lying in the same bed with a person in the small-pox; of those upon whom we cannot induce the disease by repeated inoculations, and of such as have already undergone the disease, who sustain not the least injury by receiving the variolous effluvia daily into their habit, as is the case of friends, physicians, and nurses, who attend the sick. That curious phenomenon which sometimes occurs, and of which the learned Dr Mead has given an example that happened in his own practice, serves likewise to illustrate this point, *viz.* the

C 2 infection

* Aphorism. Boerhaav. 1390. 1391, 1392.

infection of a child in the womb, by means of the mother's waiting upon one under the small-pox, while she having formerly, at a distant period, undergone the disease, and so rendered incapable of a second infection, suffers no injury or inconvenience in transmitting it to her child.

From the earliest accounts of small-pox, we find it originated in a hot climate. The phlogistic diathesis is always unfavourable to the subject infected by it. Even artificial heat augments all the symptoms of the disease, whether induced by animal foods, strong liquors, an over-heated chamber, or a hot regimen. This general and well-known character of variolous contagion, shews it to be possessed of an *inflammatory* principle; and the truth of this is demonstrated to our senses, in the practice of inoculation, where we see inflammation to be the first obvious effect of that operation. The inflammation excited under the cuticle, upon the insertion of variolous matter, cannot be a consequence of simple puncture, as raising the cuticle with the point of a clean lancet, could not produce the least

least degree of it. The excited inflammation, therefore, which occurs upon that operation, can only arise from the application of the variolous pus.

Although inflammation is the first obvious effect of variolous matter introduced under the cuticle, there appears an evident difference between this, and every other inflammatory affection; for, as neither simple inflammation, nor the highest degree of it, does ever prove contagious, it would appear, that variolous contagion must possess a property distinct from every common inflammation, by which it is rendered contagious.

The consideration, therefore, of various contagion being an animal production, the peculiar foetor which constantly attends the disease, and is invariably the same, though different in degree, both in the mildest, and in the most malignant small-pox *, lead me to view the inflammatory principle of small-pox to possess somewhat

C 3 of

* The ingenious Dr Haygarth calls it a peculiar and offensive stench." *Inquiry*, p. 20.

of a *septic* quality *; which peculiar property, distinct from every other inflammatory affection, seems to constitute the principle of variolous contagion.

As I wish not to advance any opinion which has not a foundation on facts, I shall state my reasons briefly for embracing the above view of variolous contagion.— Every species of small-pox we are acquainted with, or that have been described by authors, seems to point out the existence of the *inflammatory-septic* principle, from whence they originate. In the contiguous species, where the pustules are numerous, a considerable degree of inflammation attends every stage of the disease; at the same time, the fœtor is very considerable, and the second fever is commonly of the putrid kind. In the confluent and more malignant species, the eruptive fever, and other symptoms, indicate great inflammation, and the fœtor constant and great. Besides, we frequently find,
that

* I use the term *septic*, being unacquainted with another that occurs in diseases which propagate contagion.

that this fever, sooner or later in the course of the disease, assumes another type ; a sudden prostration of strength comes on ; the interstices of the pustules are occupied with petechiæ, and followed with hemorrhagies from the nose, lungs, uterus, &c. and the fœtor highly offensive. In every case of small-pox, therefore, we have evidence of the presence of this principle, the mildest species exhibiting some degree of inflammation, as well as of the fœtor peculiar to the disease. That the various temperaments of mankind have a powerful influence in modifying the small-pox, is beyond a doubt ; but when these temperaments coincide with the inflammatory-septic principle, the disease is always violent ; hence variolous contagion, meeting either with the phlogistic or putrid diathesis, constantly produces a severe and dangerous disease.

It may be said, that many inflammatory fevers change their type, and run into those of the typhus kind ; and therefore, the same change may follow the inflammatory fever of small-pox. It will afterwards be shewn, that fever and inflammation, of

every kind, have a tendency to attenuate the blood ; yet we apprehend, by reason of the peculiar property of variolous contagion, and its action upon the fluids, that no common inflammatory fever occurs, where a change of the type so frequently happens, as in bad cases of small-pox. Sydenham, during the latter years of his practice, became so sensible of this, that the last piece he wrote on that subject, he intitles, *Dissertatio de Febre Putrida, Variolis Confluentibus superveniente* ; which opinion is adopted by Mead, Friend, and some of our most eminent physicians.

Most writers admit the inflammatory quality of variolous contagion ; but that the inflammatory quality peculiar to small-pox is of a septic nature, appears evident from what has been already observed, and seems further illustrated by the following simple experiment : Four ounces of blood taken from a person who never had the small-pox, and suffered to flow from the vein upon a small quantity of sal glauberi in powder, and stirred till cold, to prevent coagulation, was equally divided into two phials. Phial, No. 1. contained the uncoagulated

agulated blood. Phial, No. 2. contained the same; to which was added, a small portion of variolous matter, and shaken together. Both phials were placed in a heat of 98° . The result of this experiment was, that phial No. 2. acquired a putrid smell 48 hours sooner than phial No. 1.

The same idea respecting the inflammatory-septic nature of variolous contagion, is corroborated by a fact which sometimes occurs in practice; for, while variolous contagion propagates the same specific disease in those that are susceptible of it, in others who have already undergone the small-pox, it occasions malignant and putrid fevers *.

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* A young woman, a patient in the clinical ward of the Royal Infirmary, some years ago, died under a load of confluent small-pox. She was opened, with a view to ascertain, whether there was an eruption of pustules upon any of the viscera. Most of the students who attended the dissection, were seized with a malignant fever, and narrowly escaped with life; each of them having formerly passed through the small-pox, were not susceptible of a second infection. Is it not therefore probable, that this fever, with which they were seized, was the effect of the inflammatory-septic contagion?

We shall conclude this chapter by observing, that small-pox appears to be a specific contagion.

That the contagion of small-pox is distinct and specific, is evident, from the history, peculiar symptoms, and appearances, which characterise the disease. The varieties of small-pox do not appear to depend upon different kinds of contagion, as the same contagion will propagate all the different varieties of the disease: Hence we conclude variolous contagion to be of one and the same nature; and therefore, that the different modifications of the disease must originate from another cause.

Variolous contagion will not unite with the particles of any other contagion received into the system. It is no uncommon thing to find the true small-pox, and the chicken-pox, or measles, prevailing at the same time; yet these different contagions meeting in the same subject, always appear in a distinct and separate manner. This will be known in the experience of every attentive practitioner; in illustration of which, I have inserted the following

ing cases, the truth of which may be depended upon.

A gentleman, whose child was at nurse in the country, was alarmed, upon hearing that the small-pox was in the nurse's family; he consulted his surgeon, how far it was proper to inoculate his own child, at this time only three months old. The surgeon, upon visiting the nurse's child, found an eruption of two days standing, resembling the small-pox, but more advanced than the true kind commonly are in that space of time; and with little or no fever. He suspected it to be the chicken-pox, and delayed doing any thing with his patient's child. In a few days, the nurse's child was seized with vomiting and fever, which was followed with a new eruption, which soon appeared to be the true small-pox. As soon as he could obtain matter, he inoculated his patient's child from the pustules of the second eruption. In two days, the arm discovered plain marks of inflammation. Between the fifth and sixth day, a distinct eruption appeared, without fever, or any other distress; these pustules continued

four or five days, and withered. The inflammation continued to make progress in the inoculated part, and two pustules arose near it, and filled. The ninth day from the insertion, the child became feverish ; a fresh eruption appeared, not numerous, but better filled than the former ; these continued the usual time, and the child recovered, without any bad symptom:

Another child in the same house, first took the chicken-pox, without fever, which continued four days, and disappeared on the fifth. A few days after, symptoms of fever commenced, which were followed with a mild eruption of the true small-pox.

A girl in the same family, near three years of age, was seized with fever, followed with the true small-pox ; these were intermixed with a number of small pimples, like chicken-pox, which disappeared in a few days, the others continued the full time, and she recovered.

Dr Morton supposes the chicken-pox to be the genuine small-pox, though of a milder kind ; but the ingenious Dr Heberden has properly observed, ‘ That these

' these two distempers are totally different from one another, not only on account of their different appearances, but because those who have had the small-pox are capable of being infected with the chicken-pox, but those who have once had the chicken-pox, are not capable of having it again *.'

From the cases related above, and from others of the same kind that have fallen under my own inspection, it will appear, that in the combination of chicken-pox with small-pox, the eruption of the one is always distinct from, and commonly precedes the eruption of the other; though sometimes both kinds appear at the same time, but are easily distinguished. The chicken-pox being seldom accompanied with any considerable degree of fever, is of little or no prejudice to the subsequent small-pox, nor does it seem to influence the common period of their eruption, or in any other respect to augment the disease.

It is somewhat different in the combination of measles with small-pox; for though

* Medical Transactions, vol. i. p. 433.

though the eruption peculiar to each, is perfectly distinct, the one always preceding the eruption of the other ; yet each of these diseases, being more highly inflammatory than chicken-pox, and each of them preceded by fever ; this double accession must always be hazardous in particular habits. But in comparing this with the former combination, one material difference is apparent, *viz.* that when the measles appear first, which they commonly do, they protract the eruption of inoculated small-pox for several days ; the eruptive fever never commencing till the inflammatory spots of the measles are withered ; though the cough often continues extremely troublesome through the course of the small-pox. Yet even this case is not attended with so much danger, as when measles follow a bad kind of small-pox, which has been attended with secondary fever, and has left the patient in a state of much weakness ; in this situation, the accession of a third fever, *viz.* that which constantly precedes the eruption of measles, with the hard and incessant cough which accompanies that disease, frequently

frequently proves fatal to the already much debilitated patient. As an illustration of the particular appearances, and effects of small-pox combined with measles, I refer the reader to the Philosophical Transactions, No. 429. p. 121. or to Badam's Abridgment of that work, vol. ix. p. 426.; which account in general corresponds with the particular cases of this combined disease, that have come under my notice.

In the combination of these foreign contagions, the prognosis for the most part is favourable; but in that endemic epidemic, the scarlatina anginosa, which frequently occurs in this country, when variolous contagion meets with this distemper, whether the small-pox is induced by accidental infection, or inoculation, it generally proves mortal; and therefore, children ought neither to be inoculated, nor exposed to the infection of small-pox, when the scarlet-fever prevails in any town or district.

It seems now to be an established point among physicians, that mankind are only susceptible of being infected with the genuine

nine small-pox, or chicken-pox, but once in their lives. I formerly did entertain the opinion, that this property was common to all the foreign specific contagions; but have since found in three or four respectable families, the children of each twice infected with the measles, at the distance of twelve months, or more; from each infection; the first moderate, but accompanied with all the ordinary symptoms, the second infection, much more severe; in conversation with several medical friends, I find the same has occurred in their practice; which fact being confirmed, renders all attempts to inoculate the measles unnecessary.

This singular phenomenon, of mankind being only liable to the infection of small-pox once in their lives, has been accounted for on various principles, by learned men; but as I never received the least satisfaction from any reasoning upon this point, must be content to remain in ignorance, till the nature of this contagion, and its influence on the living system, are more clearly brought to light.

C H A P. IV.

*Action of Variolous Contagion upon the Fluids,
deduced from its obvious Effects.*

THE action of variolous contagion upon the fluids, being a process imperceptibly carried on in the system, and not the subject of our senses, we can only form a judgment of the nature of that operation, by its visible effects. We plainly see, whether the disease is induced by accidental infection, or by art, an accumulation of the contagious particles generated in the blood; the most apt idea, therefore, we can form of the action of this contagion upon that fluid, is that of a ferment. The term, indeed, is liable to exceptions, as that action does not in every respect correspond with the process from which the analogy is taken: But whatever may be the properties of this contagion, or whatever its operation may be on our fluids, in the production of small-pox, it evidently acts upon them, as

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other

other ferments do, on the bodies to which they are applied, by assimilating a lesser or greater proportion of some of the constituent parts of the blood into its own nature ; and this is my chief reason for using the term.

I am supported in using this term by some modern writers of eminence ; who have applied the process itself to living matter. Dr Cullen says, ‘ That it ‘ is evident, that the contagion of the ‘ small-pox is a ferment with respect to ‘ the human fluids, and assimilates a great ‘ part of them to its own nature *.’ And Mr Cruickshank observes, ‘ Fermentation ‘ has been chiefly observed in dead mat- ‘ ter, and is commonly accompanied with ‘ ebullition and extrication of air ; but ‘ fermentation may also take place, and ‘ I believe certainly does take place in ‘ living matter. Ebullition, or any evi- ‘ dent motion, is not necessary to consti- ‘ tute fermentation ; after wine has un- ‘ dergone what is called its open fermen- ‘ tation, it continues, after it is bottled, ‘ to go through its secret fermentation, ‘ where

* First Lines, vol. ii. p. 142.

' where no motion is evident, and every body knows requires time to ripen. All that is necessary in fermentation is, that the elementary particles be separated, and recombined, so that the matter be converted into something different from what it was before *.' Doubts, however, respecting any operation of this kind occurring in the circulating fluids, have taken place, which we must endeavour to clear up, before we proceed further in the theory of this disease.

An ingenious author, expresses his regret, ' That notwithstanding the continual allusions in medical writings, to the doctrine of ferments, physicians have not explained, with the precision that could be wished, the manner in which they act, or the limits to which their operation is confined in the animal œconomy. Any contagious matter lodged in the cellular texture, or other similar situation, will ferment and assimilate the surrounding humours to its own nature. Under these circumstances, that

D 2 ' degree

* Anatomy of the Absorbing Vessels, p. 103, 104.

‘ degree of rest obtains, which is known
‘ to be requisite to every fermentative
‘ process.

‘ But how different is the condition of
‘ this matter, when it passes into circulation?
‘ These, so far from remaining in
‘ a relative state of rest, or in contact with
‘ any particular portion of the blood, it is
‘ constantly changing its place with re-
‘ spect to the particles of that fluid, as
‘ these are with respect to each other.
‘ Hence, in diseases arising from any spe-
‘ cific matter, though the noxious par-
‘ ticles may be absorbed, and floating in
‘ the blood, by stimulating or weakening,
‘ may produce effects on the vital power,
‘ suitable to their properties, the mixture
‘ of the vital fluid is not much affected,
‘ its sensible qualities are not changed. The
‘ blood in the small-pox, or in the hectic
‘ fever, from an abscess in the lungs, or
‘ other parts, will be inflamed in propor-
‘ tion to the fever excited, but it will de-
‘ rive no peculiar complexion from the
‘ particular matter occasioning that fever.
‘ Contagious matters, it is well known,
‘ are very different in their natures, some
‘ stimulate,

stimulate, as that of the small-pox ; others, as those which produce putrid fevers, are weakening or sedative ; but that these are so, in consequence of their putridity, I am neither disposed to assert or deny, being unable to offer positive proof of either position. Their subtlety eludes examination, and renders us incapable of pronouncing upon their condition, as upon the manner in which they are applied to our bodies, to impair our health. I have no objection to agree so far with the common notion, which is so confidently asserted, of their putridity, as to suppose it to be the case. I have no objection to suppose, that these noxious contagious matters, make their way into the circulation. But the question is, Whether having thus got admittance into the vital stream, they there act as ferments, and assimilate the blood to their own corrupt natures, or whether they produce their mischief by an action on the vital power, without affecting the sensible qualities of that fluid *.

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* Enquiry into the source from whence the symptoms of the scurvy and putrid fevers arise, p. 131.—134.

It is with much reluctance, that I am obliged to differ in opinion from this learned author. I shall therefore take the liberty of making a few observations on some points of doctrine contained in this quotation, with a view further to illustrate the theory of small-pox.

To require a precise explanation of the manner in which ferments act, or the limits to which their operation is confined in the animal œconomy, is a question, which, notwithstanding our great attainments in philosophy, has never yet been resolved. If we were once able to give a satisfying account of the theory of fermentation, or of the precise manner in which the different changes take place in bodies subjected to that process, it might afford a hint that would lead us to account for the mode of its operation in the animal œconomy ; but no philosopher has hitherto done this. Many of the operations of nature are only known by their effects. The chemist can only show us what is produced by fermentation ; but the most skilful in that art, has never attempted to explain the mode of its operation,

ration, even in dead matter : Far less can any satisfying account be given of its operation in the living animal.

We shall consider what evidence there is of variolous contagion acting as a ferment on our fluids, by which we may judge of the propriety of the allusion, by the similarity of their effects.

That variolous contagion, when introduced into the system, by mixing with the blood, does assimilate some of the constituent parts of that fluid into its own nature, is obvious to our senses : It shews itself in the mildest and most favourable cases of small-pox, and is still more evident where the pustules are numerous. This multiplication of the variolous contagion, is evidence sufficient for styling it a ferment, tho' we attempt not to explain the manner of its action. The blood, indeed, is not susceptible of an acetous fermentation ; but from the visible effects produced, we may, with propriety, denominate it an assimilating fermentation.

When I assert, that variolous contagion, however small in quantity, acts as a ferment to our fluids, I do not mean, by this

D 4 action,

action, that the blood is converted into pus, in the system of circulating fluids : The formation of pus being an effect of inflammatory suppuration, occurs only some days after the eruption of the pimplies. The pus being a vehicle for transmitting the contagious particles of the disease, takes place only in inoculated small-pox. There is no communication of pus by casual infection ; in this case, the contagious effluvia are received into the habit by another channel, and evidently convert a portion of the circulating fluids into their own nature.

The ingenious author admits, that any contagious ‘ matter lodged in the cellular texture will ferment and assimilate the surrounding humours to its own nature.’ But the fermentation that takes place in so small a point in the cellular texture, is of itself inadequate to the production of a large crop of small-pox, which sometimes occurs even after inoculation, where a more extensive fermentation has been carried on : and ‘ moisture’ seems to be wanting in a point so limited, a requisite as necessary for promoting the fermentative

mentative process as ‘rest.’ The state of the axillary glands, frequently shew how soon the contagious matter is transmitted into the circulating mass. Does its influence then cease, because it is in constant motion? The small-pox, by casual infection, is an exception to this idea; for, by whatever channel the contagious particles are received into the body, we have no reason to imagine they remain in a relative state of rest. Were we to admit this supposition, they would certainly produce inflammation, and raise a pustule on some of the viscera, or other internal parts where they rested,—an occurrence which never takes place in this disease; but in the course of nine or ten days, we have evidence of the multiplication of the variolous contagion in the system, inducing all the symptoms previous to eruption. Does a fermentation, then, only take place in the cellular texture, in the inoculated small-pox? Is it not more consistent to suppose, that the action of variolous contagion is the same in the inoculated, as in small-pox induced by accidental infection?

But

But how can variolous contagion produce a fermentation in the course of circulation, where we must suppose it in a perpetual state of motion? As it is admitted, that the contagious particles enter the blood, they must necessarily mix and unite with some of its constituent parts; in which case, these particles will more readily fall into contact with different parts of that fluid, in the course of circulation, than if the contagion was confined to one point, and remained in a state of rest. Variolous contagion is active and penetrating in its own nature, and though its subtlety eludes examination, its powerful effects are evident upon the vital fluid, where, instead of being extinguished as a spark of fire in water, or of rolling on in a friendly conjunction with the circulating mass, without producing any change upon its sensible qualities, we plainly see, in every bad case of small-pox, from the effects of this contagion upon the vital fluid, a considerable separation of some of its constituent parts, appearing in an accumulation of contagious ichor in the system, the quantity of which may be conceived

ceived of, by a numerous eruption of pimples over the whole surface; by its rushing to the head and faacial glands; by profuse perspiration, or diarrhoea; or general tumefaction of the body; each of which secretions partake of the contagion of the disease, as streams from the infected fountain, indicate its attenuated state, and shew, especially in cases of the confluent and malignant small-pox, that a considerable change has taken place in the sensible qualities of the blood.

There are fashions in physic as well as in every thing else, and it is to be regretted, that in our transition from one theory to another, we run too much into extremes. For a long time the humoral pathology prevailed in the schools of physic, and most diseases were supposed to originate from certain conditions of the fluids; which, in general, it must be owned, gave a very improper and fallacious idea of many diseases: It is possible the doctrine of ferments delivered in medical writings, may also have been carried too far; but this is not a sufficient reason for denying either the possibility of a fault in
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the fluids, or, that they are incapable of being acted upon by a ferment. We are of the same opinion with this learned author, the ingenious Dr Heberden, and others, that the seat of most diseases is not in the blood; but we must deny the testimony of our senses, if we perceive not only the presence, but also the powerful effects of the morbific matter of small-pox upon that fluid.

Are the sensible qualities of the blood incapable of change? such an idea would contradict daily experience; we find in some the serum in too great quantity, watery, and transparent: In others the colour of that fluid too high, almost a deep yellow. In some the crassamentum of a proper density, in others weak like a thin jelly, or wholly incapable of coagulation. In some the red particles, and coagulable lymph, in too great proportion, and in others too little. When the component parts of the blood bear a due proportion to each other, which supposes the proper action of the nervous energy, vascular system, and solids; such a state, not only constitutes health, but renders the body less susceptible

susceptible of receiving the impression of any contagion whatever; but as yet we have no fixed standard for determining the due proportions of the several component parts of the blood, which constitute this happy temperament, but find them extremely variable.

The proportion of mankind, whose habit enables them to resist variolous contagion, has been estimated by many ingenuous persons, both in this kingdom, and in other states, to be one in 15, 16, 17, or even 20. These exempts, however, hold but a precarious tenure of this good habit; a change of air, seasons, exercise, manner of living, and the intervention of other diseases, will soon induce such an alteration in the constitution, as to render them susceptible of infection. These alterations in the habit of individuals, shew some change to have passed upon the sensible qualities of the blood; we do not say it is brought into a diseased state, but into a predisposition, or change, that renders it susceptible of disease.

We have already shown, that variolous contagion being of one specific nature, its quality

quality can have no influence in modifying the disease ; and from the practice of inoculation, we have seen, that whether the matter is inserted by one or four punctures, the quantity introduced has as little influence in producing the varieties of small-pox. If neither the quality nor the quantity of the contagion, have any effect in modifying the disease, it is reasonable to suppose, that the varieties of small-pox can only arise from different states of the vital fluid. Were the sensible qualities of the blood incapable of change, or were they uniformly the same in every individual, (barring the influence of occasional causes) we should never see more than one kind of the disease. The different condition of the pus in the pustules of different sorts of small-pox is a strong presumption of the different states of the vital fluid.

Our ingenious author is of opinion,
‘ That though the noxious particles of
‘ any specific matter may be absorbed, and
‘ floating in the blood, by stimulating or
‘ weakening, may produce effects on the
‘ vital power, suitable to their properties,
‘ the

the mixture of the vital fluid is not much affected, its sensible qualities are not changed, p. 132. Again, p. 134. I have no objection to suppose, that these noxious contagious matters make their way into the circulation. But the question is, Whether having thus got admittance into the vital stream, they there act as ferments, and assimilate the blood to their own corrupt natures? or whether they produce their mischief by an action on the vital power, without affecting the sensible qualities of that fluid?

It would have been highly satisfying, if the author of these opinions had supported his assertion, by established facts, or evidence of some kind, *viz.* 'That the vital fluid is not much affected, its sensible qualities are not changed by the variolous particles being absorbed, and floating in it.' There is only one case in which this assertion receives my approbation and credit, and that is, when applied to the mildest kind of small-pox, it being evident, that where the eruptive symptoms are moderate, the pustules few

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in number, the patient almost enjoying his usual health, and scarcely requiring medical assistance ; in such circumstances, we have no evidence of the vital fluid being much affected, or of its sensible qualities being changed. But as my leading object is to treat only of those kinds of small-pox, from whence the mortality attending the disease arises ; I must refer my reader to the evidence already given, of the variolous particles assimilating a portion of the blood into their own nature ; and a presumptive proof of the powerful influence of these noxious particles upon the blood. I shall here add the following observations in confirmation of what has been already offered.

Though the contagion received into the body, does not generate pus in the vital stream, as was hinted p. 55, 56. yet in all bad cases of small-pox, we have sufficient evidence, that by its action on the fluids, a quantity, more or less, of a thin acrid ichor, is generated in them ; part of which is propelled to the surface, and appears early in the small pimples, before it acquires the properties of pus ; part runs to the head

head and fauces, and sometimes to the intestines ; and part passes off by sweat ; and, as has been observed, the large quantity of these noxious streams secreted from the blood, gives some idea how much the fountain itself abounds with them.

From the visible effects of this acrid ichor deposited in the skin, producing inflammation, &c. we may judge of its effects when accumulated in quantity, and floating in the blood, which it cannot fail highly to inflame : The inflammation induced on the vital fluid, is not an effect of fever, as it must take place before its commencement, and appears to be the immediate cause of that fever which precedes the eruption of the pustules, and frequently continues during the suppurating period ; the consequence of which continued fever must necessarily attenuate the vital fluid, and paves the way for that putrid fever, which occurs at the perfect inmaturation of the pustules. I need scarcely add, that in cases of confluent, and other bad kinds of small-pox, especially those that have been left to nature, such patients as survive the disease, are reduced

to a state of the utmost debility, and for most part a total change takes place in the constitution, the most healthy temperament degenerating into a leucophlegmatic habit, and frequently ending in dropsy. From these considerations, in connection with what has been formerly observed, we may form a judgment in all bad cases of small-pox, whether the vital fluid can fail to be much affected, and its sensible qualities changed, by the action of variolous contagion upon it.

We shall now consider, whether variolous contagion produces its mischief by its action upon what is called the vital power.

It has always been unfavourable to the progress of physic, that men of genius and abilities, from a desire of striking out something new, and from the want of patience and perseverance in collecting a competent number of facts to support their hypotheses, have not only bewildered themselves, but drawn aside others, who are searching after truth, into a labyrinth of perplexity and error. It must appear evident, however, that whatever practical superstructure

superstructure is raised upon such hypotheses, must not only prove a disappointment to the physician, but what is of more consequence, deprive the patient of cure.

The experiments adduced by Baron Haller, (to whom, in many respects, the science of physic is much indebted) in proof of an inherent power in the muscular fibres, to contract themselves, independent of the nervous energy, I can by no means view as conclusive. These experiments indeed show, that a muscle is capable of being roused into action or contraction, by the application of various stimuli to its fibres, even after it has been a considerable time separated from the body; but they do not lead to the conclusion, that there is a principle of life inherent in matter, or that this contraction absolutely proceeds from a property peculiar to, and inherent in a muscle, independent of its connection with the nerve belonging to that muscle.

Our best physiologists agree, that the nerves alone are the source of motion and sensation, and this they have proved by undeniable facts; the late Dr Whytt, and

the present Dr Alexander Monro, have shown, by a variety of experiments on different animals, that the application of stimuli to the nerve of any muscle separated from the body, will, for a certain time, rouse that muscle into contraction, as violently, and as long, as when the stimulus is applied to the fibres of the muscle. But if the fibres of any muscle are susceptible of irritation, this can only proceed from their sensibility, which we must either admit, or suppose the sensibility peculiar to the muscular fibres, to originate from another source than the nervous energy.

It is remarkable, that those animals, whose muscular parts are longest capable of being irritated into action after death, or separation from the body, such as the viper, frog, &c. appear to have larger nerves in proportion to the size of their brains, than man. I might give an example of this particular structure in the alligator, in corroboration of the various experiments that have been made on other animals; but shall only observe, that in a young alligator of ten feet long, which I dissected

dissected in Jamaica, the brain-case was remarkably small in proportion to the size and strength of the animal; and greatly disproportioned to the size of those nerves which were destined to the muscular parts: This peculiar mechanism would intimate the improbability of these nerves being solely supplied with their energy, from so inconsiderable a source, as the brain of this animal. Indeed, from the mixed appearance of some of the larger nerves, when cut into, they seem rather to be continuations of the same medullary and cineritious parts which compose the substance of the brain itself, and, for a limited time, possess the same energetic powers, even after they are separated from their origin.

For these reasons, and others that might be adduced, I am inclined to believe, that these noxious contagious matters, after making their way into the circulation, do there act as ferment, and assimilate some constituent parts of the blood, into their own corrupt natures, of which we have given so much evidence, as renders it unnecessary to have recourse to their action on the vital power, a principle con-

troverted by some of our best physiologists, and which requires a greater number of well authenticated facts to prove its existence in the system, than have yet been brought to light ; and therefore, we cannot venture to raise any practical superstructure upon such an uncertain hypothesis.

It must be allowed, that the contagious particles, having got admittance into the vital stream, and there multiplying themselves to a certain degree, by their proper stimulant nature, exhibit their first apparent influence upon the nervous system in general, producing the various symptoms that precede the eruption of small-pox. If its influence on this system may be deemed the vital power, I can have no objection to the term ; but from what has been set forth, it appears, that the accumulation of variolous contagion in the fluids, is what may be properly called the proximate cause of the disease.

I have dwelt the longer upon this argument, as it serves to open up part of the theory of this disease, which we hope to establish upon practical facts.

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The action of the variolous ferment upon the blood, in assimilating some parts of that fluid into its own nature, is slow, gradual, and imperceptible; for when, with the strictest attention, we trace every appearance that occurs between the time of inoculation, and the commencement of the eruptive fever, (excepting occasional flushings in some, and frequently startings in children) no symptom takes place that indicates any unusual commotion in the fluids during that period.

Hence, the practice of inoculation has brought to light a new and most important stage of the disease, unknown to medical writers, before that mode of practice took place; so that the terms concoction and ebullition made use of by these writers, though not explained, as they denote a violent commotion in the blood, can only be referred to the fever preceding eruption.

The assimilating process appears to be carried on in the system, from the fourth day after inserting the variolous matter; and we have sufficient reason to think the same process takes place in the dis-

ease, by accidental infection, as the precise time of many persons exposure to contagion, has been well ascertained ; only, in this case, the eruptive symptoms are commonly two days later than in the generality of inoculated patients.

Though an accumulation of variolous contagion in the system, is requisite to bring on the eruptive fever, we do not suppose the assimilating process to be completed at the commencement of that fever ; for, from what has formerly been observed, the assimilation will proceed more briskly during the fever than before it ; and this is a chief reason for practitioners endeavouring by proper means to mitigate the fever of eruption.

Whatever theory of the disease the Bramins of Indostan have adopted, the success attending their method of inoculating the small-pox, is remarkable, as they seldom lose a patient. One singularity in their practice demands our notice, *viz.* the pouring a certain quantity of cold water on their patients, from the head downwards, twice a-day, from the time of their being inoculated, to the commencement

mencement of the eruptive fever. We cannot indeed so easily fall in with their reaſoning in ſupport of this practice, *viz.* that the intended fermentation is thereby more ſpeedily and certainly promoted*. It is more probable to ſuppoſe, that as a copious fermentation might naturally be expected in that climate, the application of cold water to the body during this ſtage of the diſease, would more readily check, than promote the fermentation; and we find the application of cool air in the more northern parts of Europe, to anſwer the ſame intention.

But whatever effects cold bathing may have during the assimilating proceſs, yet even under the torrid zone, we find the danger attending it after eruption of the pimples, in a caſe related by Mr Quier, an ingenious ſurgeon of Jamaica, in his letter to Dr Donald Monro †.

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* Account of the manner of inoculating for the ſmall-pox in the East Indies. By J. Z. Holwell, F. R. S.

† The eruption of the natural ſmall-pox appeared in a mulatto boy, about 10 years of age, without his complaining

We shall next consider whether any evidence can be brought for determining which of the component parts of the blood are most readily influenced by variolous contagion.

The red particles and coagulable lymph have been justly considered by physiologists as the most inflammable parts of the blood. We may observe a prevalence of both these principles in persons of a sanguine habit ; of consequence, these constituent parts of the blood will more readily attract the inflammatory-septic principle

of

complaining of any indisposition, as he was running almost naked in very wet dirty weather. The overseer of the estate happening to see him very much bedaubed with mud, and not suspecting that he had the small-pox, ordered him to go and wash himself, which he did, by emerging himself in a stream of water; soon afterwards in the evening, he came to me, complaining of anxiety and oppression about his heart, but knew not of his being affected with the other ailment. I found the pustules of the small-pox pretty numerous all over his body, but distinct, and his pulse rather small and quick. I immediately ordered him to be put into a warm hut, and gave him some doses of the pulv. contrayero. comp. On the next morning I found him perfectly well, the variolous affection of his skin only excepted ; and from this time he had no further occasion for the help of medicine.

Account of the Small-Pox at Jamaica, p. 37. note.

of variolous contagion, which is further illustrated by the following experiments:

Blood was taken from a person who never had the small-pox the 31st October. The red particles, coagulable lymph, and serum, were accurately separated from each other, and mixed in the following proportions, in distinct phials, and marked as below:

Four ounces of a strong solution of the red particles in spring water was divided into two phials, and marked

No. 1. Red particles diluted.

No. 2. Red particles diluted with half a tea-spoonful of variolous matter, and shaken together.

The coagulable lymph being well disengaged from the red particles, was divided and put into two phials, to each of which was added two ounces of spring water, and marked,

No. 3. Pure coagulable lymph and water.

No. 4. Coagulable lymph and water, with half a tea-spoonful of variolous matter.

Four ounces of pure transparent serum was divided into two phials, and marked,

No. 5. Pure serum.

No.

No. 6. Serum mixed with the same proportion as above of variolous matter.

These six phials were placed in a heat of 98° , the result of which experiments, with their daily progress, was regularly taken down in writing, the substance of which follows.

No. 1. Red particles diluted, retained its transparency 24 hours, or a little more. In 48 hours its colour became darker, which daily increased, and towards the end of the fourth day, acquired a slight degree of fœtor, which increased daily afterwards.

No. 2. Red particles diluted, with a mixture of variolous matter, became darker in colour, and appeared thicker at the bottom of the phial, in little more than 24 hours; in 36 hours the dark colour and deposition increased, but without any bad smell. In 48 hours there appeared no deposition, but the whole contents were equally darker, and the putrid smell evident, which daily increased.

No. 3. Pure coagulable lymph and water. There was no apparent change on the contents of this phial for three complete days. The condensed coagulable lymph

lymph not being soluble in water, still retained its proper form during these days; but on the fourth day it put on a different appearance, became softer, and at last pappy, soon after which it acquired the putrid aroma.

No. 4. Coagulable lymph and water, with variolous matter, became somewhat turbid in little more than 24 hours; in 36 hours had a small degree of *fætor*; in 48 hours was remarkably fœtid, which daily increased.

No. 5. Pure serum, continued transparent and without smell four complete days; became somewhat turbid the fifth day, which increased till the end of the seventh, before it discovered the least degree of *fætor*.

No. 6. Serum mixed with variolous matter, continued transparent four days; became somewhat turbid the fifth, though sooner by a few hours than No. 5. which increased till the end of the sixth day, when it acquired the putrid smell, 24 hours before the former.

These experiments shew, that some constituent parts of the blood are influenced by the variolous contagion sooner than others:

thers : That the red particles and coagulable lymph are resolved and brought into a putrescent state much sooner than the serum, which as it requires a greater degree of heat to fix, or bring into a state of coagulation out of the body *, so, however improbable it may appear, its attenuation will be effected with more difficulty in the system of circulating fluids ; and also, by reason of its own serous nature, will more powerfully resist the influence of the contagious principle, than either the red particles or coagulable lymph.

Although the red particles and coagulable lymph plainly appear to be first affected by the variolous contagion in all the different kinds of small-pox, yet in the worst cases, where the assimilation is extensive, we have reason to apprehend the serum will also be affected. Mr Hewson has shown by some ingenious experiments, that the coagulable lymph may be so much attenuated, as even to dilute the serum †, which

* Hewson's Experimental Enquiry, Exp. x. p. 36.

† Ibid. Exp. xviii. p. 54, 55.

which effect will more readily occur, by the admixture of the variolous contagion.

The supposition of a partial fermentation occurring in the case of mild and distinct small-pox, may appear inconsistent with the common process from which the analogy is taken; but it is well known, that in the ordinary process of fermentation, it is far from being complete in the several bodies to which it is applied; in some of these, every portion of the liquid is not perfectly assimilated; the process is frequently impeded by the climate or season, retarded by cold, and accelerated by heat; hence the fermentation of malt-liquors in the northern countries, is more slow and imperfect; and that of wines in the southern, more complete.

The above well known fact, applies, in some measure, to the different progress of the assimilating process in the system of circulating fluids: In the mild and distinct small-pox, no symptoms occur that indicate a general and complete assimilation; no perceptible change in the state of the fluids; the fever and other symptoms preceding

ceding eruption are moderate. It is otherwise in the confluent, and even in the contiguous small-pox ; in these, we have evident marks of a more perfect assimilation ; the fever ardent, and all the symptoms preceding the eruption of the pimples more urgent ; an early appearance of considerable attenuation in the fluids, by a large determination of the assimilated humours to the cuticle, in the form of pimples ; to the whole surface of the body in oedematous swelling, more particularly to the head and faucial glands, and sometimes to the intestines. Where a greater and more perfect assimilation of the circulating fluids take place, we find a species of the disease produced, where many of the pustules are filled with a bloody sanguis, the interstices occupied with petechiæ and maculæ, and some of the common secretions tinged with blood.

If the violence of the eruptive symptoms depend upon a greater assimilation of the fluids, or a greater accumulation of contagious matters in the system ; we may infer, that a smaller quantity assimilated,

lated, will render all the eruptive symptoms more moderate. A few exceptions to this general observation, occur at times, where a considerable fever, and other urgent symptoms, precede the eruption of a very few pimples, arising from a peculiar irritability of habit.

F

CHAP.

C H A P. V.

1. *Different Quantities of the Variolous Ichor generated in the System, in different kinds of Small-pox.—2. The whole quantity generated, not determined to the Skin in the form of Pustules.—3. Enquiry, whether the Variolous Pustules invade the Viscera and internal Parts.*

IN the last chapter I endeavoured to prove, as far as the nature of the subject would admit, that variolous contagion has a certain action on the blood, whereby some of its component parts are assimilated into the nature of the contagion. I propose in this to shew, that different quantities of this contagious ichor is generated in the system, in different kinds of small-pox.

I consider this position as a matter of fact, which is the subject of daily observation, in all the varieties of small-pox that come under our notice. But I am enabled to bring a more circumstantial proof of

of this point, from the particular treatment of the disease in Indostan, where demonstrative evidence is afforded, that different quantities of contagious matters are generated in the system, in all the different kinds of small-pox that occur:

Mr Holwell is very particular in giving us a full account of the eastern practice, and the principles upon which it is founded; as they are far more successful in the cure of small-pox, even in that hot climate, than any of the European physicians have yet been, and as it may tend further to elucidate the theory of the disease, I shall transcribe his words upon that subject:

‘ The eastern practitioners with great modesty arraign the European practice of phlebotomy and cathartics in any stage of the disease, but more particularly when designed to prevent, or mitigate the second fever; alleging, that the first weakens the natural powers, and that the latter counteracts the regular course of nature, which in this disease, invariably tends to throw off the offending cause upon the skin: That she often proves

‘ unequal to the entire expulsion of the
‘ enemy, in which case her wise purposes
‘ are to be assisted by art, in that track
‘ which she herself points out, and not by
‘ a diversion of the usual *crisis* by another
‘ channel ; that this assistance can only be
‘ attempted with propriety by emptying
‘ the pustules, as thereby fresh room is gi-
‘ ven in them for the reception of the cir-
‘ culating matter still remaining in the
‘ blood, and which could not be contained
‘ in the first eruption ; by which means
‘ every end and purpose of averting or
‘ subduing the second fever, is obtained
‘ with a moral certainty ; whilst phleboto-
‘ my and cathartics administered with
‘ this view, are both irrational and preca-
‘ rious, as being opposite to the constant o-
‘ peration of nature in the management of
‘ this dreadful disease.

‘ It remains only that I add a word or
‘ two upon the eastern manner of opening
‘ the pustules, which (as before mention-
‘ ed) is directed to be done with a very
‘ fine sharp-pointed thorn ; experience has
‘ established the use of this natural instru-
‘ ment, in preference either to scissars,
‘ lancet,

‘ lancet, or needle; the practitioners per-
‘ forate the most prominent part of the
‘ pustule, and with the fides of the thorn
‘ press out the *pus*; and having opened a-
‘ bout a dozen, they absorb the matter with
‘ a calico rag dipt in warm milk and wa-
‘ ter, and proceed thus until the whole
‘ are discharged: The orifice made by the
‘ thorn is so extremely small, that it clo-
‘ ses immediately after the matter is pref-
‘ sed out, so that there is no admission of
‘ the external air into the pustule, which
‘ would suddenly contract the mouths of
‘ the excretory vessels, and consequently
‘ the further secretion of the variolous
‘ matter from the blood would be there-
‘ by obstructed; for this consideration,
‘ the method recommended by *Dr Tiffot*,
‘ of clipping the pustules with sharp-point-
‘ ed scissars, is certainly liable to objec-
‘ tion, as the aperture would be too large;
‘ when in the true confluent kind, and no
‘ distinct pustules present, they perforate
‘ the most prominent and promising parts
‘ in many places, at the distance of the
‘ tenth of an inch, usually beginning at
‘ the extremities; and I have often seen

‘ the pustules in the *contiguous*, and the perforated parts in the *confluent* kind, fill again before the operation has been half over; yet they do not repeat the opening until a few hours elapse, conceiving it proper that the matter should receive some degree of concoction in the pustules before it is again discharged *.’ It may be necessary to add from the same ingenious author, ‘ That so great is the dependence which these practitioners have on opening the pustules, in every malignant kind of the disease, that where the fluid state of the matter has been suffered to elapse, without being evacuated, they pronounce the issue fatal, and it generally proves so. In very critical cases, they will not trust the operation of opening the pustules to nurses or relations, but engage in it themselves with amazing patience and solicitude ; and I have frequently known them thus employed for many hours together ; and when it has been zealously persevered in, I hardly ever knew it fail of either entirely preventing

* Account of the manner of inoculating, &c. p. 38, 39.

' venting the second fever, or mitigating
 ' it in such sort, as to render it of no con-
 ' sequence, &c. *.'

What chiefly claims our attention on this subject, is confirmed by Mr Holwell's testimony, in the following words : ' In various instances, which I have been a witness to, in my own and others practice, I have seen the pustules in the contiguous kind, upon being successively opened, fill again to the fourth or fifth, and the confluent to the sixth, seventh and eighth time ; in the very distinct sort, they will not fill again more than once or twice, and sometimes not at all, which was a plain indication, that the whole virus of the disease was expelled in the first eruption †.'

This well authenticated account of the eastern practice, puts it beyond a doubt, that different quantities of the variolous ichor is generated in the system, in different kinds of small-pox. It throws much light on the theory of the disease, the

* Account of the manner of inoculating, &c. p. 36.

† Ibid. p. 36, 37.

truth of which is demonstrated, by the remarkable success of the eastern practice.

At the same time, whatever pains the Bramins may take to encourage a determination of the whole assimilated fluids to the skin ; it must appear obvious to every one acquainted with the animal œconomy, that in cases of extensive assimilation, it is impossible to prevent a considerable portion of these fluids escaping by the different excretory organs, as a load of such contagious matters, so inimical to the system, could not be suffered to continue long in the course of circulation, but must in part be carried off by the common outlets, even before the period when it is practicable to empty the pustules.

Accordingly we find even in the mild small-pox, a portion of the assimilated fluids escape by the pores ; this is evident by the peculiar smell attending the disease ; but in cases both of the contiguous and confluent small-pox, besides the matter of insensible perspiration, there is often an evident and early determination of these fluids to the head, the faucial glands, and other parts.

2. *The whole Quantity generated, not determined to the Skin in the Form of Pustules.*

HAVING frequently had occasion to observe, that a considerable portion of the assimilated fluids, escape by the cuticular pores, an idea may arise, why may not the whole of the assimilated fluids be encouraged to pass off in this way? The question was put to me by an ingenious gentleman of the profession; and though it may appear more curious than useful, as the answer may serve further to illustrate the theory of this disease, I shall offer a few thoughts upon it.

If, It is a property of foreign exanthematic diseases, to produce eruptions peculiar to their several genera, as we see in Variola, Rubeola, Varicella, Pemphigus, &c. However difficult it may be to account for this phenomenon, the matter is established in fact; nor could the distemper properly be denominated small-pox, without the presence of one or more suppurated pustules,

2. The state of the skin, may be a reason why a portion of the assimilated fluids are detained there, and do not wholly escape by perspiration. That there is a remarkable difference in the texture of the skin, will not be denied. The skin of some persons is more constricted than that of others, and of course they do not perspire so easily. The inhabitants of the northern countries, and the Indians of North America, who are in the habit of daubing the skin with paint and grease, are subject to small-pox of the worst kinds, and have the most numerous pustules, which in a great measure may be ascribed to the state of the skin, whereby a large portion of the assimilated fluids are arrested there, in place of transuding by sensible or insensible perspiration. A conviction of the hard and impervious state of the skin, led the peasants who inhabit the Carpathian mountains in Hungary, to have recourse to a tepid bath, and to continue that practice twice a-day till the eruption is completed; which method is attended with the best effects *.

It

* Comment. in Aphor. Boerhaave, 1394.

It is with a view to accelerate the eruption, that Rhazis recommends the following method : ‘ Variolarum et morbillorum exitum hacce accelerant, Ægrotum vestibus involvere oportet, et fricare corpus ; in locis non admodum frigidis locare ; frigidam paulatim ac successive forbadam dare, adeo ut sudor provocetur et eliciatur, juvetque protrusionem humorum redundantium ad extimas corporis partes.

‘ Induatur ægrotus duplii indufio, et oræ ejus vinciantur, sub illo appone duas pelves parvas, in quibus fit aqua fervens unam ante illum, et alteram pone ipsum ; ita ut vapor ad universum corpus pertingat, facie excepta ; sicque rarefiat cutis, faciliorque reddatur ad excipiendum humorem illum, eumque protrudendum, &c. *.

The skin of infants, women †, young persons, and such as are of a lax habit, is more

* Rhazis de Variolis et Morbillis, comment. sextum.

† From any observations I have been able to make, adult women pass more easily, even through bad kinds of

more pervious than that of old people, and consequently a larger portion of the assimilated fluids will fly off by perspiration; but, it is obvious, whatever causes any considerable constriction of the pores, will also occasion a larger crop of small-pox; and this is one reason why the disease bears hard upon old people. The application of a small piece of adhesive plaster to any part of the body in the stage of eruption, will occasion a greater number of pimples under it, than other exposed parts of the skin.

3. The condition of the assimilated fluids may also prove a cause of their detention in the skin. Whatever figures the particles of these fluids do assume, it is evident they consist of different magnitudes. The peculiar

of small-pox, than men; and I am persuaded, that a smaller proportion of these die, than of the latter. This I do not altogether impute to greater laxity of the skin, but to that elegant constriction of the thorax, which is more elevated and capacious than that of men; which particular construction is wisely intended for the period of gestation, when the cavity of the thorax must be diminished by the fulness of the abdomen. This peculiar form of the thorax in the female, enables them likewise to pass through inflammatory fevers with greater safety.

peculiar foetor of the disease, in every case of small-pox that occurs, mild as well as malignant, shews, that a considerable portion of the assimilated fluids fly off in the way of perspiration, whilst the grosser particles are arrested in the skin, and terminate in suppurated pustules. The same process takes place in other fluids, excreted by the cuticular pores ; the matter of insensible perspiration being a simple fluid, pervades the pores with much facility : What we call sensible perspiration, or sweat, is a more gross and compounded fluid, containing a small portion of saline matter, which, at particular times, passes the pores with more difficulty ; and frequently, by its acrimony and detention, occasions a troublesome itching, with some degree of inflammation,— a distress well known under the torrid zone, by the name of *prickly heat*. These excretions give some idea of the finer parts of the assimilated fluids making their escape by the cutaneous pores, while the more gross particles that do not so easily transude, are detained in the mouths of these excretory ducts, and, from their stimulant nature, produce the

the primary inflammation that occurs in every small pimple,

These reasons are sufficient to shew, why the whole of the assimilated fluids do not pass off in the way of perspiration.

3. *Enquiry, whether the Variolous Pustules invade the Viscera, and Internal Parts:*

THERE is no point wherein physicians have more widely differed, than this, Whether the suppurated pustules of the small-pox invade the viscera, intestines, and other internal parts?

This phenomenon has been asserted as a matter of fact, and said to be found upon dissection by some physicians of eminence in their profession, whilst others, no less respectable, have denied their existence in the internal parts. Opinions so opposite and contradictory, can neither be accounted for, nor reconciled, especially when authors of credit give each a positive testimony to their own side of the question, and as a truth which came under their particular observation. It is certain, many authors

authors are too ready to adopt the sentiments of their predecessors, without being at sufficient pains to investigate the truth for themselves; and they are the more inexcusable in a question of this nature, when ocular demonstration can so easily, and so frequently be obtained. I must acknowledge, that in the different dissections of variolous patients that I have witnessed, I have never seen the appearance of pustules upon any of the viscera, or upon the intestinal canal; nor do I think it probable they can take place in these parts.

Did variolous pustules invest the external membrane of the lungs, liver, stomach, or intestines, and pass through the common stages of inflammation and suppuration, we might expect a regular course of internal complaints, more urgent and distressing than what occurs on the surface of the body; but we never find this to be the case. Besides, we see a certain construction of the cuticle, that has an influence in detaining the assimilated fluids, that does not exist in the membranous coverings of the viscera; which are not only preserved

preserved from the effects of the external air, to which the skin is exposed, but constantly bedewed with a moisture that evinces the perviousness of their coats.

De Haen endeavours to reconcile the contradictory opinions of physicians upon this point; by alleging the small-pox disappear early in places destitute of skin, as in the tongue, mouth, palate, and internal parts of the lips; and observes, the whole mouth is free of them, after the 9th, 10th and 11th day. Hence, says he, ‘ Unless I mistake, ‘ I may conclude, that bodies dissected, ‘ after the 9th, 10th or 11th day, carry ‘ no appearance of them in the viscera, ‘ because these destitute of skin cannot ‘ maintain the small-pox so long in their ‘ dewy abodes *.’

Cotunnius dissected above forty persons who died of the small-pox, with a special view to ascertain whether any of the viscera or internal parts were invested with pustules. Each of these dissections were carried on with singular attention, and in presence

* Anton. de Haen, pars prima Rationis Medenda, &c.
p. 33.

presence of a number of students ; but no pustules, nor the least vestiges of them, appeared upon any of the internal parts. In some few cases, the internal membrane of the trachea was lined with them, even to the third division of the branches of the bronchia, which at first led him to expect the same appearance in the œsophagus ; but though the mouth, tongue, palate, and top of the pharynx, were full of pustules, none were found within the œsophagus*.

Tiffot. ‘ Cadavera quatuor olim secui
‘ quorum externa cutis vix novæ pustulæ
‘ hospitium præbuisset, nullam ostendit to-
‘ tus alimentaris tractus, nullam larynx,
‘ trachēa, pulmo. Et sane vix intelligo
‘ quomodo vixirint qui, quod plures nar-
‘ rant authores, laryngem, tracheam, lo-
‘ bos, pustulos obsessos habuerunt,’ &c. †.

It would appear to be otherwise, in some species of birds. Mr Holwell gives a short history of a parrot belonging to himself, which died of the small-pox in India. I

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shall

* Cotunn. de Sede Variol. § I. xvi.

† De Variolis, &c. p. 45.

shall transcribe his account of it, as it establishes the truth of a phenomenon, concerning which we were formerly in a state of uncertainty, *viz.* whether any other animals, besides mankind, were susceptible of variolous contagion.

' In an epidemic season of the confluent small-pox, turkeys, Chittygong fowls, Madras capons, and other poultry, are carried off by the disease in great numbers, and have the symptoms usually accompanying every stage of this distemper. I had a favourite parrot, who died of it in the year 1774. In him, I had a fair opportunity of observing the regular progress of the disorder. He sickened, and had an ardent fever, full two days before the eruption, and died on the seventh day of the eruption. On opening him, we found his throat and stomach, and whole channel of the first passages, lined as thick with pustules as the surface of his body, where, for the most part, they rose contiguous, but, in other parts, they ran together *.'

In

* Account of the manner, &c. p. 25. Note. .

In these circumstances, the death of this favourite bird was noway surprising, as the same degree of inflammation and suppuration upon the stomach and intestines would have destroyed the stoutest of the human race; and we must account it a fortunate circumstance to mankind, if this internal invasion of the pustules is only peculiar to the feathered tribe.

C H A P. VI.

Predisposition necessary to Infection.

THE small-pox being a foreign contagious disease, there is no inevitable necessity for any person undergoing it; if we are so fortunate or attentive, as to avoid the sphere of active contagion, we shall always escape infection. By all accounts, the people of Great Britain enjoyed as good health, and lived as long, before the small-pox was imported into the island, as they have done since. The examples they give us of weak and sickly children, who have acquired a state of good health, after passing through the small-pox, are no proper argument for the necessity of suffering the disease, in order to improve the constitution, as it will probably be found, the small-pox has impaired more good constitutions, than improved bad ones.

We are not possessed of any facts that enable us *a priori*, to ascertain wherein this

this predisposition in the habit consists, and therefore must have recourse to the same mode of reasoning we were obliged to employ, in treating of the action of variolous contagion upon the fluids, *viz.* to trace the cause by its apparent effects.

It is evident, however, that a few cases occur in practice, where no predisposition in the habit subsists. When small-pox prevail at any time, we may observe, that some, both children and adults, escape infection, though surrounded with the contagion, by daily associating with the sick, or sleeping in the same bed *. In like manner, we are taught by the practice of inoculation, that while some children of

* Several examples might be brought in proof of this fact. I shall only give one, which occurred in my own practice: A child on the breast under small-pox, of a distinct kind, whose nurse, of 20 years of age, never had the disease; nor was she infected at that time, though she suckled the child through the course of the distemper, and for several months after, and slept with her every night. She went afterwards to London, and at the distance of two years, was seized with confluent small-pox, and narrowly escaped with life.

a family are easily infected with the disease, it is impossible, by repeated trials, to convey it to others, who, in the course of some months, catch the infection accidentally, or readily receive it by inoculation. This well known phenomenon attending small-pox, will appear the less singular, when we reflect, that the same observation has been made respecting the plague, a more virulent contagion; the history of which shows, in every invasion of that dreadful malady, that many escape infection, though constantly employed about the sick, or infants sucking their infected mothers *.

The persons exempted from predisposition to small-pox infection, for most part enjoy a state of good health; and, so far as experience has led me to observe, it is generally the firm, sprightly, and vigorous habits, (making proper allowance for the time of life) that are most apt to resist the influence of variolous contagion; and, in general, whatever tends to debilitate

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* See several examples of this, in Hodge's *de Peste*, and Fuller's *Exanthemata*.

the system, renders it more susceptible of infection *.

This peculiarity of habit, which enables a small proportion of mankind (see p. 61.) to resist variolous contagion, is by no means permanent, as there hinted; a change of air, climate, season, mode of living, or the intervention of other diseases, frequently induce such an alteration in the habit, as to render them susceptible of infection.

Although predisposition to disease in general, points out something faulty in the habit, is a declination, in some degree, from perfect soundness of body, and a prelude to an opposite state; yet this is not always the case in a predisposition to va-

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riolous

* There is one exception to what is above asserted, viz. in subjects where serosity abounds in the habit. It was observed, page 75, 76, 77. and confirmed by some experiments, that the serum resists the influence of the variolous ferment, much longer than the other constituent parts of the blood; accordingly, we find those phlegmatic habits resist the contagion of small-pox, as much as the healthy temperament does; and this excess of serosity must be corrected, before the disease can be induced.

riolous infection. In every mild species of small-pox, where the eruptive fever, and other symptoms, are moderate, we view the predisposition as purely simple, and unaccompanied with morbid affection in the system ; this kind of simple predisposition, may exist a long time in the habit, without exposing the subject of it to any other disease that we know of.

But we learn from some well known facts, that children of one family, infected by the same contagion, or inoculated with the same matter, produce in some a mild, in others, a very malignant kind of small-pox, we are obliged to consider this last sort, as originating from a morbid predisposition, which always exposes the infected to a dangerous disease.

In a former chapter, we endeavoured to show, that variolous contagion acts upon the blood ; it is therefore in that fluid we are to look for the predisposition, whether simple or morbid. Though mankind in general, in the strictest sense, may be said to be of one blood, yet different climates, modes of living, air, exercise, indolence, luxury, intemperance, want of common

common necessaries, or the continued use of such as are of a bad kind, cannot fail to influence and diversify the sensible qualities of this one animal fluid.

As the far greater part of mankind, infants and adults, are possessed of a predisposition, which exposes them to variolous infection, we may enquire wherein it consists ; in general, we see, that in those subjects that are without predisposition, the variolous ferment has no power nor influence in converting any part of the blood into its own nature ; but after being received into the habit, passes off by the common excretions, without the least hurt or disturbance to the œconomy. So, where a predisposition exists, we find the vital fluid in a state or condition, which admits the contagion to unite with, and so to operate upon some of its constituent parts, as to assimilate a larger or lesser proportion of them, into its own nature, producing cutaneous eruption.

The diversity of temperaments, which, from the causes above specified, necessarily exist in the human race, lay a foundation for those varieties of small-pox, which daily

daily occur ; and as these do more or less coincide with the nature of the variolous ferment, will always produce a correspondent disease.

Not to multiply temperaments, of which we have but a vague and uncertain knowledge, we shall only mention two, which experience evinces, powerfully predispose the subjects of them to the reception of variolous contagion. I mean the sanguine habit, and that impoverished and resolved state of the blood, denominated by many good authors, the putrid habit. These are known in fact to be unfavourable to the reception of small-pox contagion, they accord with the nature of the contagion itself, and always produce a violent and dangerous disease. The sanguine habit is universally admitted, as inimical to small-pox ; the putrid, though much more so, will be denied by those who consider the existence of such a quality in the circulating fluids, to be incompatible with life.

That the animal frame has a natural and constant tendency to putrefaction, is the opinion of some of our best physiologists ; they

they differ indeed as to the seat of this affection ; some think it resides in the solids, others in the fluids ; whichever of them it is, we should suppose a quality of this active nature would quickly communicate its baneful taint to every part of the machine : A consideration, however, of the means that nature employs to counteract this putrefactive tendency in the system, will throw some light upon this question. One essential mean employed by nature, in obviating this dangerous and destructive tendency, is the regular and constant recruits, which the system daily receives, of cooling and nutritious aliment ; it is evident, that this aliment makes its way into the vital fluid in the first place, before it can transfer any restorative influence to the muscular and more solid parts. Deprive the blood of this necessary refreshment, for twelve or twenty-four hours, and we shall find what is exspired from the lungs, shall be so very fœtid, that the person will scarcely be able to endure his own breathing. The ingenious Dr Lind observes, that some of the Romish clergy, who are in the habit of frequent fasting,

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are much afflicted with putrid gums, and an offensive breath. Can we ascribe this sudden effect of fasting to a disease originating in the solids? Is it not more consonant to the laws of the œconomy, that the blood, being deprived of regular supplies of mild and nutritious chyle, must be first affected by this loss, and that the solids suffer in a secondary way only.

I mentioned under this head, an impoverished and resolved state of the blood, as equivalent to what is termed by some the putrid diathesis; but what degree of resolution is necessary to denominate that fluid putrescent, or putrid, I cannot take upon me to say; for a slight degree of resolution, which may occur quickly, from an increased action of the arterial system, can no more denominate the blood putrid, than a simple relaxation of the muscular fibres, would constitute putrefaction in the solids.

The ingenious author of an enquiry into the source from whence the symptoms of scurvy and putrid fevers arise, gives a very proper definition of putridity: ‘ If ‘ putridity,’ says he, ‘ actually took place,
‘ in

' in the vital fluid, its first effects would be,
' to break down the texture of its parts,
' as it does that of every other body ; it
' must render it incapable of coagulation,'
*&c.**. Now, this is a condition of the
vital fluid, which we sometimes have oc-
casion to see in particular habits, who,
whether in health, or under disease, possess
a greater thinness or tenuity of blood,
than others. In the beginning of typhus,
when some inflammatory symptom leads
us inadvertently to take away blood ; or,
in a nasal hæmorrhage in the putrid fever
of small-pox, when we have opportunity
of receiving the blood into a cup ; we
shall find, in any of these cases, that fluid
very different in consistence from the or-
dinary appearance of good blood, its tex-
ture being so much broken down, that ei-
ther the coagulum is very weak, or it does
not coagulate at all. And indeed we have
examples upon record, of frequent hæmor-
rhages from the nose, mouth, uterus, &c.
as well as petechiæ, maculæ, &c. that evi-
dently appear to arise from a resolved
state of the fluids ; the ingenious Dr Per-
cival

* Enquiry, p. 54.

civil has given us a case of this kind, in his Essay on Salt, taken from the Philosophical Transactions, vol. lviii. p. 6.

' A young lady aged 16, tall, thin, and
' of a delicate constitution, though in to-
' lerable good health, was advised to use
' sea water, on account of a strumous swel-
' ling and inflammation of her upper lip.
' She drank a pint of it every morning for
' ten days successively, which did not pass
' off freely by the usual evacuations. At
' the end of this period, she was suddenly
' seized with a large discharge of the *cata-*
' *menia*. Was perpetually spitting blood
' from the gums, and had innumerable
' petechial spots on different parts of her
' body. Her pulse was quick, though
' full, her face pale and somewhat bloat-
' ed; her flesh somewhat tender; she was
' often faint, but soon recovered her spi-
' rits. The flux from the *uterus* at length
' abated, but that from the gums increased
' to such a degree, that her apothecary
' took a little blood from her arm. From
' the orifice blood continually oozed for
' several days. At last an hæmorrhage
' from the nose came on, attended with
' frequent

' frequent faintings, in which she at length
' expired, choaked as it were with her
' own blood. Before she died, her right
' arm was mortified from the elbow to the
' wrist. And it is further to be remarked,
' that though blood let from her some
' weeks before she began the use of the
' sea water, was sufficiently dense, yet
' that drawn in her last sickness, was mere
' putrid and dissolved gore *.'

The above case, as it clearly proves the existence of that state of the vital fluid denominated putrid, where the texture of its parts evidently appear to be broken down, and rendered incapable of coagulation ; so by it also, we receive another piece of information, if I may be pardoned the digression, *viz.* that sea-salt accumulated in the habit in a certain quantity, proves *one* immediate cause of scurvy.

This doctrine, which has been universally received for some ages, upon the credit of many respectable authors, both of the last and preceding centuries, who had great opportunities of investigating the disease ; has also received the sanction of some

* Medical Experiments and Essays, vol. 2. p. 118.

some of our best modern physicians, as of Linnæus, Cullen, &c. together with the practical observations of several experienced and attentive naval surgeons; yet within these few years has been controverted, because other supposed causes of this distemper have been brought to light; but why should we exclude this cause from others, seeing it is demonstrable from the above, and hundreds of similar cases.

The supposed mortification * upon this lady's arm, before mentioned, taken in connection

* It is of importance in practice, to make a proper distinction between sphacelus, and the livid or black effusions, which take place in the limbs of scorbutic patients; the distinction is evident in several particulars; the common, and well known symptoms of scurvy, never accompany the mortification of any member. Vesications constantly attend sphacelus, but are seldom if ever seen in scorbutic effusions. If sphacelus admits of cure, it is by a separation of the dead from the living parts; no such occurrence takes place in scurvy; in the last and worst stage of the distemper, if the patient's life can be preserved till he is carried on shore, and enjoys the refreshments of the land, it is scarce possible to believe, how quickly these black effusions assume another colour, without any separation of the parts. In scarifying a mortification, the part being dead, is insensible to the knife, and little or no moisture escapes by the incisions.

connection with all the other symptoms of her distemper, clearly points out a deep scorbutic affection, a disease well known to the surgeons of his Majesty's navy, though seldom occurring on land. And if we subjoin to this lady's case, the account of a voyage made by the Sheernefs man of war, Captain Palliser, to the East Indies, and published by my ingenious friend Dr Lind, in his essay on the health of seamen, we have the above truth corroborated beyond all manner of dispute. This ship's crew, upon leaving England, agreed together and obtained the Captain's

H permission,

sions. In scarifying a scorbutic effusion, the wounds are extremely painful, and they are followed with a constant discharge of a thin bloody fancies. In a ship of war, where I once had the honour of serving, the scurvy appeared during a long cruise; one of the surgeon's mates, who had never seen the disease before, and considering the black effusions on the limbs, to resemble mortifications more than any thing else, took upon him, to treat them as such, and scarified the legs of two of the worst of them, from the knees to the ancles; the consequence of which rash operation was, several painful wounds, with a constant and great discharge of a thin bloody fancies, which cut them off in a few days.

permission, to refrain from the use of salted provision during their voyage to India. The consequence was, that after a passage of five months, the ship arrived at the Cape, without having so much as one man sick on board. The ship remained in India some months, where they were well supplied with fresh provisions ; trusting to this, and in hope of a short run to the Cape, they used their salted meats for ten weeks till they arrived there, at which time 20 of their men were miserably afflicted with the scurvy. These, however, soon recovered by the land refreshments. Upon leaving the Cape, they again resolved to desist from a full use of their salted flesh, and arrived at Spithead with their full complement of men, in perfect health, and with unbroken constitutions.

That peculiarity of habit which is exempted from predisposition to small-pox infection, supposes, and is connected with, a sound state of the vital fluid ; and this good habit, we are persuaded, is often transmitted from healthy parents to their offspring ; as on the contrary, we see weakly diseased

diseased constitutions, handed down by others to their posterity.

A sound and lively child brought into the world, cannot long enjoy a state of health, without accurate and attentive management. Nature points out its most proper food, and the healthy mother is seasonably provided with supplies for this purpose. When from inevitable necessity infants are deprived of this their first natural food, it must be highly prejudicial to them, both in early and later life, as there is no other aliment so well calculated for their tender state, or that can lay the foundation of a firm constitution.

The quality of our foods, in conjunction with good air, cleanliness, and proper exercise, have a considerable influence in supporting and preserving a good habit of body. The nature of our aliment should be suited to the years of childhood and maturity. Weaned children ought to be cautiously and gradually introduced to the use of animal food, especially previous to their having the small-pox, unless where constitutional weakness renders it necessary. The velocity of the blood's circula-

tion in infants, and the great degree of heat in consequence thereof, which is common, and in some respects, necessary to them, shews the importance, as well as the reasonableness of their using a simple cooling diet, and of their being habituated to cool air; milk, farinacea in different shapes, and vegetable substances, afford a wide field for following out a regimen of this kind.

Active and laborious people, require solid animal food; and this is rendered more salutary, by a due proportion of bread, or other vegetable matters. But if young people have advanced to manhood, without undergoing the small-pox, in a country where the contagion of that disease is universal, they ought not to indulge too freely in the use of animal foods, but observe a more cooling regimen, which will prove an habitual preparation in the event of accidental infection.

If the regular and constant supplies of proper aliment is one of the principal means of preserving the animal fluids from running into a resolved or putrefactive state, which is highly probable from what has

has been above asserted, we may be assured, the chyle produced by some particular foods has a far greater tendency in promoting this end, than that which is the product of others. The recruits furnished the blood by chyle, produced from too great a proportion of animal and heating substances, cannot possibly answer this intention equally well with that which is prepared from cooling and vegetable foods.

The late ingenious Dr Macbride has assigned a good reason for this. ‘ This general and well-known antiseptic quality in vegetable food, is commonly accounted for, by saying, that it produceth acescent chyle; but alkalescent or putrescent vegetables are equally powerful in this respect with acescent; therefore, the antiseptic quality must depend upon somewhat that is general and common to all vegetables.

‘ Instead, therefore, of calling chyle, produced from a vegetable diet, acescent, we shall speak with more propriety, as well as approach much nearer to truth, by terming it, a fluid composed of animal and vegetable juices, in the first or

' sweet stage of fermentation, impregnated
' and fully charged with a subtle, active,
' and penetrating spirit, which is highly
' antiseptic *.'

As, by the experiments of other philosophers, that subtle spirit, termed fixed air, which enters into the composition of all bodies, more particularly of vegetable substances, is demonstrated to be of an acid quality, styled, by Bergman, aerial acid; we may easily perceive with what propriety it may be considered, as that general principle in the system, which prevents and opposes the habitual tendency of our humours to putrefaction.

We shall conclude this chapter, by a more particular consideration of the two diatheses, which we reckoned powerful predisposing causes towards the reception of variolous contagion.

I. An excess of the red particles of the blood, and of the coagulable lymph, which commonly go together in this diathesis, constitute

* Experimental Essays, 2d Edit. p. 159, with the Note at the bottom.

constitute an unfavourable habit for the reception of variolous contagion ; for, though when these constituent parts of the blood are duly proportioned to the serum, they make up a considerable part of that temperament which resists the influence of variolous contagion ; yet, when these two principles happen to prevail, as we have shewn them to be the most inflammable parts of the blood, they must prove a more powerful pabulum for attracting the variolous ferment ; and in spite of every precaution, according to the degree of their existence, produce a violent and highly inflammatory disease.

The indications of this habit are well known. It is generally attended with a florid complexion,—a strong and rather quick pulse,—an habitual tendency to fever, and other inflammatory disorders,—a good appetite, and quick digestion,—a temper of mind commonly hasty, impatient and irascible.

Variolous contagion meeting with the sanguine habit, is attended with a variety of the most urgent symptoms. The eruptive fever runs high, continues longer, and

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commonly requires a large bleeding before the eruption appears, especially if the disease occurs in the winter season. The usual relief obtained by the first day's eruption, is never so perfect as in the general run of ordinary small-pox ; neither is there a perfect remission of fever, when the eruption is completed. After all the attention we can pay to cases of this kind, by strictly pursuing the antiphlogistic regimen, the most favourable kind of disease we may expect, is a large and universal crop of distinct or contiguous small-pox, highly inflamed and painful, which, together with other causes, keep up a degree of fever and restlessness through the course of the disease, and frequently terminate in a fever of the putrid kind.

2. A resolution of the red particles, and attenuation of the coagulable lymph, are effects which frequently occur in the system, though in different degrees. It is a temperament natural to some families ; and, when it is hereditary, may be greatly increased by external causes ; and even these causes of themselves are sufficient to induce the habit,—such as a course of close

close sultry weather,—a continued application of warm humid air to the body,—animal steams, where many persons are crowded together, in small ill-ventilated apartments,—putrid exhalations,—the air of an hospital, where putrid ulcers, dysenteries, &c. prevail. Some of these causes act as fermenters, and sooner or later bring the blood into this state, which renders it extremely unfit for meeting with small-pox contagion*.

This habit, more than any other, proves unfavourable to small-pox contagion, and manifests itself by unusual debility on the first invasion of the eruptive fever; the white of the eye is inflamed, and sometimes of a yellowish colour; the tongue parched, and the breath offensive.

The eruptive fever, at its commencement, frequently assumes the common inflammatory

* The history of epidemic diseases, in certain seasons, and in particular places, where one or more of these causes operate, afford a clear proof of what is above asserted. I refer the Reader to an Essay on Epidemic Diseases, by Dr Joseph Rogers of Cork, Dr Huxam on Fevers, &c.

flammatory appearances. If a natural haemorrhage occurs, the blood is thinner in consistence, and darker in colour than good blood; if received in a cup, the serum is of a deeper yellow than it ought to be, and the coagulum weak; petechiae appear in a more early or later period of the disease; the salival and urinary discharges, are often tinged with blood, and the stools uncommonly foetid.

The indications of this habit are very different from what we described under the former. In general, the complexion is pale, the fibres soft and relaxed; persons of this constitution are fatigued with very small exertions, and, on many occasions, liable to faint.

If we have reason to suspect the presence of the putrid diathesis, variolous contagion is to be shunned: Nor ought any of this habit to be inoculated; for, however small the degree of it may be, the resolution of the blood is hurried on, by means of the variolous ferment, and the disease is attended with the utmost danger. We have reason to apprehend, that small-pox contagion,

contagion, meeting with this habit, has, in some families, sometimes swept off the whole of the children*.

* A family in the country, consisting of eight children; seven of them having been cut off, at different times, by casual infection, the parents were prevailed upon to inoculate the eighth; but the event was the same,—he died, though very particular attention was paid him.

CHAP.

C H A P. VII.

Proximate Cause.

THE doctrine advanced, chap. v. respecting the action of variolous contagion on the fluids, in assimilating a lesser or greater proportion of them into its own nature, being admitted, we shall be able, with more exactness, to ascertain the immediate cause of small-pox. That action, indeed, does not fall under the inspection of our senses, but it is established upon facts, which evidently appear in the progress of the disease; in this view, we shall find there are few diseases where the proximate cause appears with more evidence and certainty, and consequently, where the indications of cure are more apparent, nor where the mode of treatment, arising from these indications, is oftener crowned with success. If these positions are made good, they will evince the truth of the theory upon which the practice is founded, more effectually than all the reasoning

ing that has been used, and put us upon a more rational and determinate plan of practice.

Notwithstanding the varieties of small-pox, which daily occur, in consequence of the action of this specific contagion, its operation on the blood appears to be the same in every case, *viz.* in assimilating a smaller proportion of that fluid in the mild and distinct kind, and of a larger proportion in the confluent and malignant species of that disease. In the first of these cases, the variolous ferment seems to meet with greater resistance in its mixing, and uniting with the blood; in the second, the predisposition being more powerful, from the causes specified in the preceding chapter, the assimilation, in consequence, will be adequate to the condition of the vital fluid. Other causes may occur, in modifying the disease, as the season, intemperance, violent exercise, confined, or too moist air, &c.; but the chief cause of the varieties of small-pox, seems to arise from the predisposition.

The blood, in consequence of the action of the variolous ferment, during the stage of

of fermentation, being more or less assimilated, and the contagious particles accumulated in the system, we consider to be the *proximate cause* of small-pox.

This view of the proximate cause of small-pox, coincides with the history of the different species of that disease, whether mild or malignant; for example, we evidently see, when the assimilation is moderate, as in the mild distinct sort, where the whole of the contagious fluids are propelled to the skin in pustules, perspiration, &c. there is a perfect remission of fever, and of every other symptom. On the other hand, in those cases where the assimilation is great, so that the whole of the contagious fluids cannot be deposited in pustules on the skin; and though a part of them must necessarily be determined to the faucial glands, to the mucous glands of the intestines, to the surface of the body in general swelling, or pass off by perspiration and urine: In cases of such extensive fermentation, we have sufficient reason to think, that the same cause which at first excited the eruptive fever, continues to operate, (though in a less degree)

viz.

viz. by a quantity of the morbid fluids still remaining in the circulating mass: And this cannot fail to take place, if we consider, that when the predisposition is unfavourable to variolous contagion, the assimilating process must go on more rapidly during the eruptive fever, than before its commencement; and the greater quantity of contagious matters generated, must necessarily keep up the fever, so that cause and effect act reciprocally upon each other.

A certain period of time seems necessary for effecting such a multiplication of the contagious particles, as is necessary to induce the symptoms that precede the eruption of the pimples; in the inoculated small-pox, we find this to be a period of eight or nine days; and when we are able to trace the time of accidental infection, it is commonly two days more; but generally about these periods, the blood being so far impregnated with the contagious particles, by their influence on the nervous and arterial systems, produce all the symptoms that precede the eruption
of

of the pimples, which is commonly understood to be the commencement of the disease.

A difficulty occurs here, not easily obviated, *viz.* How, at a certain period, the same eruptive symptoms should be brought on, whether the assimilation proceeds no further in the fluids, than to produce six pustules on the cuticle, or to propagate a large and universal crop of contiguous or confluent small-pox?

We can go no farther in resolving this difficulty, than by observing, that these inflamed and contagious particles, which are all of the same nature, whether few or many, cannot be retained long in the course of circulation, without producing effects, by which they are dispersed to the different outlets of the machine: We observed, that even in the mildest small-pox, the whole of the assimilated fluids are not determined to the skin, in the form of pustules, there being evidence of a part escaping by insensible perspiration, and probably by other secretions: And it is obvious, when a larger quantity is generated, that a considerable part of the assimilated fluids, is determined to the head,

to

to the faucial glands, and to the whole surface of the body and extremities, in œdematosus swelling. It is evident, however, that, in general, the symptoms which precede the eruption of mild and distinct small-pox, are much more moderate in every respect, than those which precede the confluent and malignant kinds, which is an observation also of Sydenham *.

* Sydenham, Op. p. 135.

C H A P. VIII.

1. *Symptoms preceding Eruption.*
2. *Eruption.*
3. *History of contiguous Small-pox.*
4. —— *of the simple confluent.*
5. —— *of the putrid.*
6. —— *of the crystalline.*

THE treatment of the mild small-pox, where generally the eruptive symptoms are moderate, and the pustules few, being so well known, and for most part requiring little medical assistance, I pass over. The mortality attending this disease, arising chiefly from the worst kinds, I have chosen these, as the subject of my present inquiry.

The first obvious symptoms that precede the eruption of small-pox, are lassitude and debility. A child, at this period, becomes spiritless, loses relish for food, as well as its usual entertainments, and discovers

discovers an evident degree of languor and oppression. A grown up person becomes listless, and indisposed for the common actions of life, inclines to yawn, and courts rest and heat.

These symptoms are frequently followed by a sensation of cold, which proceeds to a severe fit of shivering, that lasts an hour or more; during the latter part of the cold fit, vomiting comes on, and continues at intervals, till the eruption appears.

The eruptive symptoms sometimes commence with vertigo and vomiting, especially if the patient is seized after a full meal; and often continue twenty-four or thirty hours, if he attempts an erect posture, or even raises his head from the pillow.

Sometimes the first apparent symptom is *fever*, which, for most part, appears of the inflammatory kind, accompanied with cephalalgia, or lumbago, and often both.

The cold fit is succeeded by ardent heat; a quick, often strong and hard pulse; thirst, watery and inflamed eyes, accompanied with cephalalgia, delirium, great anxiety

and restlessness, a parched tongue, high-coloured urine, and a costive belly: Where lumbago does not occur, flying pains through the body and limbs, and frequently a dull pain in the region of the stomach, especially upon pressure, a general stiffness and tumefaction over the body.

This tumult in the system, more especially in adults, is followed either by a tendency to perspiration, or diarrhoea: The first, Sydenham considers an indication of the distinct, the latter, of the confluent small-pox.

In every bad kind of small-pox, the eruption is ushered in by a scarlet-rash, which appears first upon the face, neck, and breast, and sometimes spreads over the whole body; it is observed some part of the second day, and within twelve hours, sooner or later, the pimples emerge from these inflamed parts of the skin.

In some cases, the inflammatory fever changes to the *typhus*, or low kind. The swelling of the head and face appear early, as well as a general tension and tumefaction over the surface of the body and extremities.

tremities. Petechiæ show themselves sometimes before the eruption of the pimples, and sometimes after. In a few cases, the fever is of the typhus kind from its commencement.

Children, in the beginning, are often attacked with cephalalgia and lumbago, frequently become comatose, and start often, but still disposed to sleep. Coldness in the extremities attends the disease, even though mild, especially in children, from the first attack. Some are subject to one or more convulsive fits, a few hours preceding the eruption of the pimples; and, in particular habits, they recur occasionally through the course of the disease.

It is almost unnecessary to observe, that each of the above symptoms do not occur in every patient, nor do they accede in the precise order I have laid them down, but vary almost in every case. It will also appear, that several of these symptoms are common to fever, though their early appearance and violence are strong indications of fever with eruption, especially when we have reason to suspect infection,

tion, or when the disease prevails in the place.

The pathognomonic symptoms that precede eruption, are few. Coldness in the hands and feet, especially the latter, accompanies no other febrile disease that I know of. Obtuse pain about the epigastric region, a convulsive fit, if dentition is over. And though lumbago sometimes accompanies other acute diseases, as it more frequently occurs in small-pox of a bad kind, I think it ought to be considered as a discriminating symptom. Swelling of the head and face, frequently accompanied with petechiæ, appear early in bad cases, and clearly point out the disease.

There is one case attended with peculiar symptoms, which falls under this period of the disease, and demands particular notice. It seems to arise from a peculiarity of habit, where the symptoms of debility and oppression continue for some days, without any apparent feverish paroxysm, the heat of the body being natural, and sometimes even below the common standard. These appearances occurring where we have reason to suspect variolous

riolous infection, as they indicate a want of energy in the system, are attended with the greatest danger. The child (for the case commonly happens in infancy) labours under a languid oppression, having no appetite for food, nor desire of drink, but rather a small degree of nausea, is incapable of being diverted as at other times, and is generally comatose, or disposed to slumber. In this case, nature sometimes accomplishes the eruption of a very few pimples, which shew themselves the third day after sickening, but disappear soon, and the child dies in a kind of lethargic state. The same appearances in delicate habits, follow injudicious bloodletting, or an imprudent application of cold air in the commencement of the eruption.

2. *Eruption.*

Having mentioned the common and ordinary symptoms that precede the eruption of small-pox, we shall now consider the eruption itself, and such symptoms as

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accompany

company or follow it, till the termination of the disease.

The symptoms that precede eruption, generally continue with little or no mitigation, till several hours after its appearance.

The commencement, as well as the termination of the eruption, is different, in different kinds of small-pox. In the common run of mild small-pox, the ingenious Dr Cullen's character of the disease, universally holds good, ‘Tertio die ‘incipit, et quinto finitur eruptio, &c.;’ but in bad kinds, which I have chiefly in view, the eruption often appears in some part of the *second* day, and sometimes the end of the *first* *, and fresh pimples continue to appear for the space of three or

four

* As days are often mentioned in a general way, and misunderstood by the vulgar reckoning, it is necessary to ascertain their precise meaning. As a complete day consists of twenty-four hours; if the symptoms preceding eruption commence on Monday, at four in the afternoon, the third day terminates on Thursday, at the same hour. In the vulgar measurement of this period, and even according to *Sydenham's* way of reckoning, Thursday would be considered as the fourth day.

four complete days. During the period of eruption, the patient sneezes from time to time, we judge of the eruption being completed, when he ceases to do so.

As the number and figure of the pustules, the condition of the *pus*, or whatever is contained in the pustules, serve to distinguish and characterise the various kinds of small-pox; so some of these varieties influence the period of eruption. Daily observation concurs with the testimony of the best writers, to show, that an early eruption always indicates a bad disease; whereas, if the eruption is protracted to the end of the third day, we have reason to expect a favourable kind. The eruption induced in some bad cases, is lengthened out beyond the third day, by the violence of some prevailing symptom. Hence, Sydenham observes, ‘Quan-
‘toque magis quartum illum diem, præ-
‘verterint variolæ tanto etiam confluēnt
‘magis. Quamvis autem, ut generaliter
‘loquamur, confluentes diem quartum
‘vix præstolentur unquam: Fit tamen,
‘licet oppido raro, ut ob atrocius aliquod
‘symptoma, ad quartum vel quintum us-
‘que

‘ que diem, differatur eruptio; verbi
‘ gratia, acutissimus dolor nunc in regio-
‘ ne lumborum, paroxysmi nephretici æmu-
‘ lus; nunc in latere, qualis pleuriticos
‘ vexat; nunc in artubus, ut in rheumatis-
‘ mo; nunc denique in ventriculo, cum
‘ ingenti ægritudine et vomitu enormi
‘ ante eruptionem ægram fatigat, angit-
‘ que *.’

3. *History of contiguous Small-pox.*

In classing the varieties of small-pox, we shall retain the common distinctions that have long prevailed among the writers on this subject; who have properly divided them into *discretæ* and *confluentes*; but as considerable varieties occur under each of these, for greater distinctness, we shall subdivide them; the *discretæ*, into *benignæ et adjunctæ*: *Confluentes*, into *confluentes simplices, putridæ, et crystallinæ*. I pass over the first, viz. *discretæ benignæ*, as being well known, and confine my enquiry to the other

* Sydenham, Op. p. 135, 136.

ther kinds, which require a particular discussion, each of them being attended with imminent danger.

Variolæ discretæ adjunctæ, commonly called *contiguous small-pox*. The pimples emerge from the skin in distinct points, but differ from the benignæ by their greater number, and vicinity to each other, for which reason some have called them coherent. In this kind we frequently meet with a few of the circular confluxes ; as in the confluent, several of the contiguous appear ; the prevailing number, however, of discretæ, or confluente, in any case, determine the character of the species.

The fever accompanying variolæ adjunctæ is for most part of the genus synochus of Dr Cullen's nosology. The symptoms preceding eruption are generally violent, and indicate a considerable degree of inflammation ; but sooner or later the fever puts on the typhus form, especially if the disease has not been properly treated from its commencement.

The eruption is commonly preceded by a fiery rash, or efflorescence, which shews itself on the face, neck and breast, and sometimes

sometimes extends over the whole body. It appears towards the close of the second, or beginning of the third day, and from which in the course of some hours, the pimples emerge.

The patient, though somewhat relieved by the eruption of the first and second day, yet never so perfectly as in the benign kind, at the same periods ; the frequency of the pulse, and heat of the body abate a little, but we seldom or never observe a perfect remission of fever, even after the eruption is completed ; though the symptoms in general are moderated, especially if a free perspiration takes place.

If neither perspiration nor diarrhoea occur, swelling of the head and face, with general tumefaction of the body, come on sooner ; but it may be observed, that diarrhoea serves to alleviate all the symptoms more than any other of the common excretions. The swelling of the head, face, and fauces is generally followed with ptyalism.

Cephalalgia for most part commences with the eruptive fever, and continues during that period ; or if a remission of this symptom

symptom takes place, in consequence of the eruption being completed, it recurs with delirium, as the swelling of the head advances, especially towards evening when there is commonly an accession of fever.

Angina commences with the eruption, or soon after; it is more acute in this kind, than in the mild disease, and is attended with pain, parchedness and stiffness of the parts, hoarseness and difficult deglutition, and abates with the salivation or diarrhœa.

The fever, and most of the other symptoms continue through the period of suppuration, though not so violent as before the eruption; that is, the pulse is reduced from 140 to 100, or 90 in a minute.

Though the pimples in all sorts of small-pox appear only as so many inflamed points on the cuticle, upon their first eruption, yet they daily increase in magnitude, and assume different figures according to their kind; on the second or third day, when examined accurately, they contain a thin ichor, which gradually acquires a more purulent appearance.

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The contiguous small-pox commonly advances to a tolerable suppuration, though the pus is always thinner in consistence, and inferior in quality to that of the mild kind.

As the suppuration of the pustules advances, towards the close of the fourth day of eruption, the interstices redden and swell, shewing a small inflammatory ring encircling the base of each pustule, by which the irritation and stiffness of the parts is increased, especially on the wrists ; and about this time the superior palpebræ begin to be distended with lymph, have a shining appearance, and cannot be elevated till the tumefaction of the head subsides.

On some part of the seventh day of eruption, the pustules on the face put on a new appearance, change to a brownish colour, feel rough at their tops, and gritty to the touch. This change of colour in the pustules, though it takes place in every species of small-pox, is most remarkable in the mild sort, which contain a white and more perfect *pus* than the others. The gritty roughness upon the apices

pices of the pustules, appears to be a transudation of the thinner parts of their contents, through the cuticular pores, which, from the effects of the air, hardens, and occasions that roughness and change of colour.

It is upon the seventh day that the true figure of the pustules is best observed. The different shape and form of the pustules in the different species of small-pox, seems to be solely influenced by the condition of the pus. The best small-pox, *viz.* the benign, rise into a globular shape, and form perfect circles at their base. The bases of the contiguous are not perfect circles, but the nearer the general run of them approach to a true circle, we form the more favourable prognosis of the disease. Though this kind acuminates, yet each pustule has a small fovea or depression at its apex.

Towards the end of the eighth day, a train of severe symptoms arise, by the accession of what is termed the second fever. The pulse quickens, the heat of the body increases considerably, accompanied with thirst, great anxiety and restlessness, céphalalgia,

lalgia, delirium, short and confused slumbers." The salivation abates, and by reason of the viscosity of this secretion, it is discharged "with much difficulty. The hoarseness recurs, attended with dyspnœa. The patient is scarcely able to swallow, and whatever liquid he attempts to drink, is forcibly returned through the nose; symptoms of phrenitis sometimes occur, or he becomes lethargic.

These symptoms are often so sudden and violent, especially when no attempts have been made to obviate them in an early period of the disease, that if not speedily relieved, death must soon follow.

It may be necessary to observe, that not only in the contiguous, but the simple confluent small-pox, both which kinds are characterised by universal inflammation in their first stages, yet the second fever for most part assumes the typhus type, more especially in those cases where the disease has been left to nature, or not treated in a proper manner.

Variolæ confluentes simplices, are so termed, not only on account of their distinction from the preceding contiguous small-

small-pox, but also from the *putrid* and crystalline kinds. The history of the symptoms peculiar to confluent small-pox, coincide with those of the contiguous, though in general they are more violent, both before and after eruption. The inflammatory rash appears some part of the second day, from which the pimples emerge rather sooner than in the last described species.

The eruption of the pimples is very different in appearance from that of the contiguous; for though a few distinct pimples rise in different parts, a far greater number shoot up in circular clusters of about one-third of an inch diameter, each cluster containing seven or eight small fiery points, which in the progress of the suppuration, run into and communicate with each other, so as to form a flat irregular surface.

As the pus contained in the pustules of *contiguous* small-pox, is inferior in quality to that of the benign kind, so that peculiar to the *confluent*, is much thinner and inferior in quality to the contiguous; this is a chief reason of the different si-

gure of the confluent, which never accuminate like the former, being only a very little raised above the cuticle in a flat surface.

Ardent fever, with symptoms of high inflammation, accompany every stage of the disease, unless a proper method has been taken to moderate them. But by the common practice employed in the cure of confluent small-pox, they generally terminate in a fever of the putrid kind.

Swelling of the head, face and fauces appear early, generally from the commencement of the eruption; and if no diarrhoea comes on, notwithstanding of the ptyalism, these parts fwell to a monstrous size.

Cephalalgia, delirium, angina and lumbago are more acute and obstinate than in the contiguous kind; nor are these symptoms so much mitigated by the complete eruption of pimples, as in the last mentioned sort.

A brisk fever continues through the suppurating period, and evinces a quantity of morbid particles still existing in the fluids, which by their constant irritation keep up
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the fever, and augment every other symptom.

The same inflammatory appearance surrounding the confluxes of this kind, as we described under the contiguous small-pox, is evident upon the completion of the eruption, and the same distension of the superior palpebrae with lymph.

The colour also of the confluent small-pox, changes upon the seventh day ; but by reason of the different confluxes running into one another, the face appears as if a piece of parchment was extended over it.

The second fever commences some part of the eighth day, when the different symptoms mentioned under the same period of contiguous small-pox take place, even in a higher degree. This is the dangerous day (the 11th of the disease), so often spoken of by Sydenham, which cuts off most patients; through the violence of the fever, the impetus of blood to the head, and the difficulty of discharging the saliva, the unhappy sufferer dies either suffocated or lethargic. To obviate this fatal period, is one leading intention of

the method of cure laid down in the following sheets.

Both the contiguous and simple confluent kinds, may strictly be considered as highly inflammatory small-pox.

5. History of the Putrid Small-Pox.

Variolæ confluentes putridæ *, may originate from small-pox contagion, either meeting in that habit where we find the presence of a weak and resolved state of the blood, or where some of the occasional causes, mentioned page 120, concur with variolous contagion in promoting that habit.

The genus of fever which accompanies this species of small-pox, varies ; that which precedes the eruption of the pimples is for most part of the inflammatory kind, and continues so till the eruption is completed, and sometimes till the eighth day,

* Although I have affixed the term *putrid* to confluent small-pox, which commonly takes place, yet we frequently find putrid symptoms accompanying both the contiguous and crystalline species.

day, when the fever changes its type to one of the low kind. In some, the disease begins with symptoms of inflammation, and the typhus appears immediately upon the eruption being completed.. Sometimes the inflammatory symptoms recur with the second fever. In a few, the typhus accompanies the disease from its commencement till its termination.

All the symptoms which have been ascribed to the contiguous and simple confluent small-pox, and each of them, if possible, in a higher degree, are common to this kind, *viz.* debility, vomiting, fever, cephalalgia, delirium, lumbago, obtuse pain in the epigastric region, inflamed and watery eyes, parched tongue, limpid urine at first, and afterwards high coloured.

Besides the symptoms common to small-pox in general, there are a few peculiar to this species, that demand our notice.

*Petechiæ** constantly attend this kind of small-pox. Indications respecting these

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spots

* The name of petechiæ, from the Italian pedechio, as resembling the bites of fleas, which point out their original size, as well as their never rising above the skin.

spots are taken from *the time of their appearance, their number, and colour.* As an early eruption of the variolous pimples is a certain indication of a violent disease, the same prognosis is formed, from the early appearance of petechiæ. In some cases, they commence with the eruption of pimples, or even before them; in others, not till the fourth or fifth day after: The one shews the pre-existence of the putrid diathesis in the system; the other, the presence of that habit, tho' less powerful, and consequently less formidable.

The number of petechiæ also point out a less or greater degree of malignancy. In some cases, they are easily numbered, and do not exceed thirty or forty: They are first seen on the neck and breast; but when numerous, they occupy the interstices of the pustules over the whole body and extremities.

The colour of the petechiæ is another source of information, respecting the degree of putrid diathesis subsisting in the habit. The mildest and most favourable spots, are those of a faint red colour, which kind are generally late in their appearance;

ance; yet, in the progress of the disease, if the patient is kept too warm, or otherwise improperly treated, the prevalence of this disposition increases, and the spots acquire a darker hue.

When the petechiæ are of a bright purple or black colour at their first appearance, they generally commence with the eruption, or soon after, and indicate a greater prevalence of this habit, which affords an unfavourable prognosis; but if, by proper management, the purple or black spots change to a pale red, and gradually disappear, the prognosis is favourable.

Another symptom attending the putrid confluent small-pox, is that of *maculæ*. They are of the same nature with petechiæ, spring from the same cause, and indicate a resolved state of the vital fluid. They are of two kinds, and both considerably larger than the petechiæ,—the one of a lively purple colour, and circular,—the other yellow, more extended, and of an irregular figure, very much resembling an ecchymosis from a bruise. They are both under the cuticle, and indicate a greater attenuation of the circulating fluids than

petechiæ do, though they frequently meet together in the same subject.

In this kind of small-pox, a number of the pustules are filled with a bloody sanies. We judge of the degree of malignancy, from a greater or smaller number of the pustules being filled with this mixed humour.

The patient is liable to hæmorrhages from the nostrils, lungs, uterus, and intestines ; and frequently some of the ordinary secretions are tinged with blood, in greater or lesser quantity, such as the urine and saliva.

The tumefaction of the head, face and body, appear early, and sometimes increase to a considerable size, particularly the head, unless the proper method has been taken to obviate this symptom.

On the eighth day, the second fever commences, or, more properly, a continuation of the same fever that preceded the eruption of small-pox, which, tho' somewhat mitigated during the suppurating period, is now considerably augmented with increase of the several symptoms that accompanied the eruptive fever, all of which

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are aggravated by *dyspnœa*, hoarseness, difficult expectoration, and stoppage of the salivary discharge. At the same time, appearances of local inflammation in the head or breast occur, and sometimes stupor.

When typhus accompanies the disease from its commencement, the symptoms differ from those described under the last species. The fever is accompanied with great debility, and prostration of strength; frequent alternations of heat and cold; the pulse variable, but in general weak and quick; the mental powers confused, and apparently much disturbed; a great degree of anxiety and restlessness; the speech faltering; the tongue at first moist, but in a few days much parched; the teeth black, and the breath offensive.

Cephalalgia not so acute as in the former kind, the pain being rather obtuse, with a sensation of weight in the head; the lumbago violent, with dull pain in the epigastric region; petechiæ and maculæ appear early, for most part accompany, and sometimes even precede the eruption of the pimples.

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The contents of the pustules are either of a watery nature, or, if more coloured, like serum ; soon appear to be tinged with blood ; as are sometimes the saliva, the urine, and the intestinal discharge, which last is uncommonly fœtid.

Tumefaction of the head, face, and trunk of the body, commences with the eruption, or soon after.

Considerable hæmorrhages from the nose, lungs, intestines, &c. appear at an early period, and sometimes cut off the patient before the seventh day. During the course of the disease, there is much difficulty in supporting the vis vitæ.

6. *History of Crystalline Small-Pox.*

Variolæ Crystallinæ, though they accord with the last-described kind in many symptoms, yet they are evidently a distinct species of the disease, and generally more malignant.

This kind of small-pox assumes different appearances, and therefore a good writer upon

upon the subject has subdivided it into different species*; but as the varieties of this sort seem to arise from the operation of the same cause, on different habits, or different degrees of the same habit, I have, on this account, brought them under one view.

This species of small-pox appears to originate from the same causes assigned for the production of variolæ putridæ. Why these do not always produce similar effects, may arise from their longer continuance, or more powerful operation. It is evident, however, that most of the symptoms peculiar to the putrid confluent kind, are common to the crystalline, which are marked with evident indications of general debility.

We may observe, in this place, the influence of local situation, in modifying certain kinds of small-pox, or, more properly,

* The late sensible and ingenious Dr Joseph Rogers of Cork, who had the greatest opportunities of acquainting himself with this species of small-pox, has subdivided it into the following kinds: distinct lymphatic, coherent lymphatic, and confluent lymphatic.

perly, in predisposing the habit to generate certain kinds. Single cases of crystalline small-pox occur in most towns of Great Britain; but we never have occasion to see this particular species prevailing universally in any part of the kingdom. Why it did prevail for a succession of years in the city of Cork in Ireland, may be gathered from Dr Rogers's description of that place, an abstract of which I shall give *.

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* The city of Cork, from its situation upon the edge of the great Atlantic Ocean, the winds three parts of the year blowing from W. and S. W. drench the inhabitants in the warm and watery vapours detached from the surface of that wide extended sea. The city situated in a deep valley, built on islands, surrounded by branches of the river *Lee*. Considerable marshes to the east and west. Quantities of animal offals occupy the streets, and particularly the close confined alleys and lanes, at the season endemial epidemics rage most. A great number of slaughter-houses in the north and south suburbs. Vast pits containing putrefying blood and ordure, which even corrupt the northern blasts which blow down upon the city. Vast quantities of animal offals used by the common people in the slaughtering seasons, rendered more pernicious, by the quick transition from diet of another kind, and different nature.

Essay on Epidemic Diseases, p. 25, 36, 37.

I am happy, however, to understand, that by improvements in the police of that city, since the period of his practice there, (somewhat more than half a century ago), several considerable sources of the malignancy of that disease are removed, and of consequence the small-pox has assumed a more favourable appearance since that time.

The genus of fever attending this species of small-pox, is for the most part the synochus of Dr Cullen's Nosophy ; the inflammatory fever, and other symptoms, appear first, and sooner or later the low fever.

The crystalline small-pox partake of the symptoms common to the disease in general,—of several that accompany the confluent putrid kind,—and of some peculiar to itself.

Debility, vomiting, fever, cephalalgia, lumbago, anxiety, pain in the region of the stomach, and coldness of the hands and feet, are symptoms common to all kinds of small-pox, and also accompany the crystalline. It participates likewise of some symptoms peculiar to the putrid confluent

fluent small-pox, *viz.* petechiæ, maculæ, vibices, and haemorrhages, from different parts. Besides these, the following symptoms, which in general are peculiar to the crystalline, at least they oftener accompany this kind than any other.

The eruption of the pimples is more unequal and irregular, than in any of the former kinds. The first, and perhaps the second day's eruption, is sometimes promising; the pimples are of a proper colour, distinct, few in number, and even produce a mitigation of the preceding symptoms; but so deceitful are these appearances, that on the third day, a sudden, unexpected, and numerous crop of pimples appear, which, though distinct, are unequal in their figure, and not perfectly circular.

Though a small abatement, both of fever and other eruptive symptoms, takes place on the complete eruption of the pimples, yet there is never a perfect remission. The urine is commonly limpid through every stage of the disease.

The lumbago is for the most part violent, and in children, frequently attended with abdominal pains.

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The symptom which more particularly distinguishes this species of small-pox from every other, is the pellucid fluid, which soon begins to show itself in the pustules, and seldom or never advances to a purulent appearance; towards the seventh or eighth day, it resembles pale whey, with a brownish crust.

We find frequently interspersed among the *crystalline* small-pox, several pustules that only contain a little air, and some that are perfectly clear, dense, and warty. In cases where either one or other of these are numerous, as happens in a few instances of the malignant kind, they have been considered by some authors, as two distinct species of small-pox, and have obtained the name of *Vacuæ* and *Verrucæ*. I never did see any case, where the whole pustules were either empty or warty, but have occasionally observed a few of one or other of these interspersed among the crystallines.

As the pimples of this kind become pale, after the first or second day's eruption, so the interstices have not the fresh lively appearance which attend the more benign

benign kinds, and no inflammatory ring encircling the base of the pustules.

Swelling of the head, face, and fauces, more uncertain and irregular in its commencement, than happens in the kinds formerly described: It is sometimes so late in its appearance, as the sixth or seventh day, continues for a day or two, and then is suddenly translated to the hands or feet; when this occurs, there is no salivation.

In bad cases of this kind, which generally may be suspected from the severity of the eruptive symptoms, the pimples appear on the second day, and are for the most part either of the coherent or confluent kind, in which the fever is commonly low, and accompanied with great oppression. Petechiæ, maculæ, and large yellow subcutaneous effusions, show themselves early, sometimes before the eruption of the pimples.

In such cases, there is no equal gradual tumefaction of the head and face, the natural features continue, excepting a fiery swelling about the eye-lids and lips.

A stubborn delirium, and sometimes phrenitis, accompany bad cases of this kind. Cephalalgia is frequently acute, with lancinating pains, especially at first; and when it is not seasonably relieved, becomes dull, with a sensation of weight, and the patient becomes drowsy and comatose. In these circumstances, a few have discharged pus from the ears, which showed these symptoms to have originated from internal inflammation and suppuration.

Upon dissection, the head, in those who have died of this kind of small-pox, the blood-vessels of the meninges were found remarkably turgid, which appearance may be accounted for, by a singular symptom, which often occurs in crystalline small-pox, *viz.* the pulsation of the artery at the wrist being weak and small, while that of the carotids is remarkably strong, and shews a particular determination of blood to the head.

Some patients have subsisted under this species of small-pox, three weeks or more, and a few have recovered, by means of large abscesses forming in different parts

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of the body, and the pus either finding a vent for itself, or being discharged by an opening.

Several have been carried off suddenly, and even in an early period of the disease, by hæmorrhages from the lungs, kidneys, uterus, or intestines.

Late recoveries from this kind, have been followed with loss of sight of one or both eyes, and the face often greatly disfigured. In general, however, most patients die the eleventh day, and a few survive till the 14th or 17th day.

CHAP.

C H A P. IX:

Indications arising from the preceding histories.

—*Stage of Fermentation.*—Where inflammatory Symptoms prevail.—*Examination of the Effects of perspiration.*—*Ptyalism.*—*The Urinary Discharge.*—*Diarrhœa.*—*Opinion of Authors concerning Diarrhœa, and purging in Small-pox.*

BEFORE entering upon this important part of the subject, we must observe, that small-pox, though one of the most formidable and destructive diseases to which mankind are exposed, is nevertheless more under the controul of the physician, than any other acute distemper we are acquainted with, as the knowledge of its remote cause, and the evident effects o that cause operating in the system, puts it in our power to obviate the worst, and most dangerous symptoms of the disease.

We have formerly observed a period of this malady, brought to light by the practice of inoculation, *viz.* from the time of inserting the variolous matter, till the commencement of the eruptive symptoms, which we have called *the stage of fermentation*, during which period no apparent commotion occurs in the system, if we except some slight temporary flushings, and starting in children, or sometimes a convulsive fit, towards the close of it; it is evident, however, this is the stage in which the variolous ferment multiplies itself in the circulating fluids, and when accumulated to a certain degree, brings on the symptoms that precede the eruption of the pimples. But as the severity of the eruptive fever, and of all the other symptoms very much depend upon the quantity of contagious matters generated in the system, this period merits particular attention, either in the case of inoculation, or when we have reason to suspect accidental infection.

The indication therefore in this first stage, is to prevent as much as possible, too great an assimilation of the variolous ferment,

ferment, which may be effected by observing the following directions.

Animal food, wines, and every thing of a heating nature, are to be prohibited. Though the season be cold, the patient ought not to sit too near the fire ; his bed-chamber ought to be kept cool ; and he should not sleep with too great a load of bed-clothes. Violent exercise of every kind is to be avoided, whether by walking, running, or dancing. The regimen of the mind is also of much importance, and ought to be attended to. In short, whatever has a tendency to accelerate or increase the fermentation of the contagious particles, must aggravate all the symptoms that precede eruption, and cannot fail to propagate a large crop of small-pox.

The patient therefore, during the stage of fermentation, should be directed to a cooling and vegetable diet, fruits of the season, and subacid drinks ; to use moderate exercise, such as will not quicken the circulation, nor induce much heat ; the mind to be kept in a placid state ; children are not to be fretted ; they ought to sleep in a large cool chamber, with few

bed-clothes ; if habituated from infancy to cold bathing in the morning, this practice ought to be continued till the commencement of the eruptive symptoms ; and in sanguine and full habits, a cooling laxative should be prescribed at least twice, at proper intervals, before the eruptive symptoms appear.

In classing the varieties of this disease, we observed that both the contiguous and simple confluent small-pox, are always attended with symptoms of high inflammation. The putrid and crystalline species, though frequently ushered in with a fever of the inflammatory kind, yet sooner or later, manifest evident tokens of a weak and resolved state of the fluids. The inflammatory septic principle of the contagion, is apparent in each of the above varieties ; for though high inflammation marks the character of the two first, yet towards the close both of the contiguous and simple confluent small-pox, the fever frequently changes its type to one of the low kind ; and in the two last, when the
putrid

putrid symptoms are more prevalent, we have the presence of inflammation in some degree, either in an early or later period of the disease.

The indications of cure where inflammatory symptoms prevail, are,

1. *To moderate the inflammatory fever.*
2. *To diminish the excess of the contagious fluids.*

We shall then consider how far the above indications may be applied to the other species of small-pox.

1st, *To moderate the inflammatory fever.*

As a fever of the inflammatory kind always accompanies the contiguous and simple confluent small-pox, and shews itself by a quick strong, or hard pulse, great heat, thirst, flushed countenance, and inflamed eyes; quick respiration, cephalalgia, delirium, lumbago, &c. In these circumstances, the first obvious indication is *bleeding*.

The degree of fever, the violence of the symptoms, the age and habit of the patient, must determine the quantity of blood to be taken away, or whether this opera-

tion may not be successfully repeated previous to the eruption. The apprehension entertained by some physicians of the last age, concerning the poisonous nature of the small-pox, as it laid the foundation of the hot regimen, so it led them to oppose bleeding in this early period of the disease, lest by weakening the vital powers, nature should be unable to propel the contagious particles from the internal parts to the surface : Daily observation however shews, that when the eruptive fever is high, the eruption is not only accelerated by bleeding, but we often see it protracted from the want of that operation.

The only difficulty with respect to bleeding, lies in discerning the nature of the fever, seeing that both the *putrid* and crystalline species, are for the most part ushered in by a fever of the inflammatory kind : But even in this case, the experienced physician will be able to distinguish the true inflammatory fever from that deceitful appearance of it which so frequently precedes a putrid disease. The vigour of youth, a sanguine habit, the winter-season, the violence of all the symptoms, clearly

clearly point out an inflammatory disease. The years of infancy, a weak, relaxed, and irritable habit; a warm, moist, or sultry season; a certain languor and oppression that accompanies a putrid fever, even when it assumes appearances of inflammation, will lead the wary practitioner to be cautious in taking away blood, even though symptoms are apparently urgent. And when petechiæ or maculæ appear in an early period of the disease, no person will venture upon bleeding. Dr Sydenham does not appear to make the proper distinction between these two opposite habits, and so we find him directing bleeding upon observing the petechiæ, from an apprehension of their being occasioned by the violent motion of the blood, bursting through the cutaneous vessels. But it does not appear that petechiæ or bloody urine owe their existence to the momentum of the blood, but are rather indications of a weak and resolved state of that fluid. We may indeed be sometimes deceived by the violence of inflammatory symptoms in the commencement of putrid fever, and may be induced to open a vein; but the attenu-
ated

ated state of the blood, the sinking of the pulse, and other circumstances, will shew, that this operation is by no means eligible in such cases.

Although blood-letting may be of signal use in an early period of the disease, when the inflammatory symptoms run high, we can by no means recommend the general practice of that operation in every case of small-pox. The impropriety of it, where we have reason to suspect the putrid diathesis, is manifest; and in the mild small-pox, it is unnecessary, and may be hurtful. We have examples in children of irritable habits, where the eruptive fever is considerable, and all the symptoms severe, while at the same time the assimilation is so moderate, as only to produce a very few pustules; in such cases, it is better to wait on, and to employ such other antiphlogistic means as we have in our power.

The ingenious *Dr Tiffot* entertains the same idea with respect to bleeding. ‘*Præter venæ sectionem, in miti morbo iniutilēm, in mitissimo aut maligno nocivam, in gravi repteudam initio donec ex pul-*
‘ *su,*

‘ su, lenitatem cutis et remissione sympto-
‘ matum noscas resolutam esse phlogisti-
‘ cam diathesim, liberatas partes inflam-
‘ matas molitam cutim, &c. *.’ He has
indeed recourse to the operation in every
period of the disease, when inflammatory
symptoms prevail; but as many of these
symptoms originate from an excess of the
variolous particles remaining in the system,
they are more effectually relieved by a
gradual evacuation of them: bleeding can
do little more in that disease, than to relax
the arterial system; and whenever that
is effected, a single repetition of it may be
of much detriment to the patient, as it
cannot fail to weaken the powers of life,
and has very little influence in reducing
the proximate cause.

A confirming evidence in favour of
blood-letting in an early period of inflam-
matory small-pox, is afforded by the ex-
amples we have on record, of the speedy
relief many have obtained by hæmorrhages
from the nose, uterus, &c. as well as
from the large quantity of blood that has
been

* Tissot de Variolis, &c. p. 38.

been taken away when inflammatory symptoms are violent, during the eruptive fever, when there was no suspicion of small-pox.

It may be necessary to observe, that in infants, and young subjects, where the eruptive fever is considerable, and the symptoms in general continue with severity, that this evacuation may be accomplished by the application of one or two leeches to the ankles.

In pursuance of the *antiphlogistic regimen* under this stage of the disease, the eruptive fever may be moderated by attending to the following directions.

If no diarrhoea occurs, the belly, if constive, ought first to be opened by a laxative clyster, and a cooling purgative administered the following day.

Where the skin continues parched and dry, by which all the eruptive symptoms are aggravated, a gentle diaphoresis may be promoted by draughts of thin gruel, acidulated with lemon-juice, sage-tea, or cold water, according to taste; nothing contributes

contributes more to answer this intention, than the saline draughts, where the acid somewhat prevails ; these are found to be highly refreshing, and induce a degree of tranquillity over the whole system.

With a view to moderate the eruptive fever, Sydenham very judiciously recommends keeping the patient out of bed by day, and exposing him to cool air ; this direction may be complied with, in cases of moderate disease ; but where the fever is high, and other symptoms violent, it is impossible for the patient to keep out of bed, or sit upright for a few moments : in this case, his chamber ought to be large ; he should lie upon a hair matras, instead of a down or feather-bed ; his covering ought to be as thin, and light as the season will permit ; and a free ventilation of air kept up, by open windows and doors.

In prosecuting the same intention, the patient's diet ought to be spare, and of a cooling and vegetable nature ; a cup of thin panada acidulated with the juice of lemons or oranges ; ripe fruits of the season ; stewed apples, pears, or prunes ; a cup of flummery with milk : His drink ought

ought to be of the same nature, plain cold water, whey, lemonade, curran-jelly dissolved in hot water and cooled; and what is not inferior to any of these, when it can be obtained, is fresh butter-milk, which is generally found to be highly agreeable, cooling and refreshing.

Perhaps there is no one expedient more effectual in moderating the eruptive fever, or more useful and salutary in every stage of the disease, than the *application of cool air*. The more urgent and severe the symptoms are, the more does the patient require this salutary remedy; and as has been hinted, he may enjoy the benefit of it, when confined to bed, as well as when he is able to sit up; it is impossible to conceive, where the ventilation is free, how powerful and refreshing its influence is, and how suddenly it is capable of bringing down the pulse, and of moderating all the symptoms. Such as have had ocular demonstration of the wonderful effects of the application of cool air to their patients, cannot avoid regretting the unhappy fate of multitudes, even since the days of Sydenham, that have been in a manner suffocated,

focated, and the disease aggravated to the highest degree, by an opposite course. Yet after all the experience we have got of its salutary effects, so great is the power of prejudice in favour of old habits, and these founded on false hypotheses, that it is with the utmost difficulty mankind are brought to relinquish them.

For the benefit of such, and in illustration of the signal advantages derived from the application of cold air, in every stage of the small-pox ; I have taken the liberty of transcribing a few cases, from Sir George Bakers *Enquiry into the merits of a method for inoculating the small-pox, &c.* with some sensible and ingenious remarks of that gentleman, which publication having now become scarce, and only in few hands, I consider the cases however there contained as too material to omit, and shall therefore present them to the reader.

‘ Whether the inoculators (of whom the author had been giving some account) had, or had not the authority of *Sydenham* in their eye; the improvements introduced by them, seem principally to depend on their having carried *Sydenham’s* notions

' notions into execution with greater latitude and extent, than he himself ever ventured to do. Indeed they have almost made it certain, that we can hardly err in pursuing the cold regimen. What can be a stronger confirmation of this, than the following fact, related by the elder Dr *A. Monro?* "I have good information, says he, of one hundred and twelve people being inoculated in the middle of winter, in some of our most northern isles, where there was scarce fewel enough to prepare victuals, and many of the inoculated went abroad bare-footed in snow and ice; and yet not one of the whole number died."

' Let any one reflect on the situation of these poor people, in that northern climate, and almost destitute of fewel in the depth of winter, (most probably having had little or no preparation), and yet all recovering from inoculation;— and then let him, if he can, defend the benefits which arise from the warmth of a bed, from nursing, and from cor-dials.

‘ It

‘ It would be an acquisition of the
‘ highest importance to mankind, if from
‘ these premises some practical conclu-
‘ sions could be drawn, which might sug-
‘ gest to physicians, a more efficacious
‘ method, than is at present in their hands,
‘ of treating the natural small-pox; which,
‘ it must be acknowledged, is too fre-
‘ quently found to be a most intractable
‘ disease. The history recorded by Syden-
‘ ham, of the young man at Bristol, who
‘ owed his recovery to his being laid out
‘ on a table, as if dead, is sufficiently
‘ known. To this history, there is a great
‘ resemblance in a case which is men-
‘ tioned by Dr Kirkpatrick, as having hap-
‘ pened in Carolina. Mr Benjamin Ma-
‘ rych had a violent natural confluence
‘ in the hot weather.—His attendants
‘ thought him dead; upon which the
‘ sashes were immediately set open, and a
‘ fresh quantity of air, or possibly a wind
‘ rushing in, produced a fresh respiration
‘ and motion in the person who was
‘ thought dead. When this was observed,
‘ they went to put them down again. The
‘ patient who saw it, and was speechless,

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‘ but sensible of the alteration and benefit,
‘ beckoned with his hand to prevent them;
‘ and by degrees entirely recovered.’

Another case of the same kind, is attested by a gentleman of great judgment and experience, and whose veracity is undoubted. The following is his account of it: ‘ In the year 1736, a man who lived
‘ as servant with Mrs Broderep, one of
‘ the daughters of Archbishop Wake, in
‘ Great Ormond Street, had the confluent
‘ small-pox; and on the evening of the
‘ 15th or 16th day, his life was entirely
‘ despairs of. On the next morning,
‘ when I went rather to enquire after
‘ him, than to visit him, the nurse’s re-
‘ port was, That he had grown worse and
‘ worse till 2 or 3 o’clock in the morning;
‘ at which time that he ceased to breathe,
‘ became insensible and motionless, and
‘ appeared to be absolutely dead. About
‘ 5 or 6 o’clock in the morning, the body
‘ was removed, and placed on a large
‘ table, near an open window, with no co-
‘ vering except only a shirt. No sign of
‘ life appeared, but the body continued
‘ hotter than common after death. This
‘ heat,

heat, however, the nurse attributed to the weather. In this state he had remained about an hour, when the nurse heard a sort of sigh, or faint breathing; and it was observed, that he had moved his arm across his stomach. Being raised up with some difficulty, he took a spoonful of a cordial medicine, ordered for him on the preceding day; and as soon as he was able to speak, he said that the cold air was very refreshing. Being carried back to the bed, he fell into a sweat, and slept three or four hours. About this time, I saw him. His pulse was now equal and strong; his respiration better than it had been for several days before; and his senses perfect. The door and windows were left open, and in a few days the man was quite out of danger *.

Doctor Pultney, physician in Blandford, in his letter to the same ingenious author, giving an account of the unsuccessful inoculation, which happened in that town, in

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* An Enquiry into the Merits of a Method of Inoculating the Small-pox, &c. p. 48, — 55.

the year 1776, among other causes, observes, ‘ It is needless to add to you, how mortifying it is to a practitioner, to be a witness of the mischiefs, caused not only by hot things given during the eruptive fever, but especially by the pernicious custom of depriving the sick of fresh and cool air; which the more we see of the small-pox, the more reason we have to conclude to be one of the most powerful antidotes against their malignant effects. There is a fact, notorious in this place, which remarkably confirms such an opinion. And one would have thought, it would of itself have been sufficient to have convinced every inhabitant of the town, that no great danger is to be apprehended from fresh air, in this disease. I allude to what happened at the time of the fire at Blandford, on the 4th day of June 1731; at which time, upwards of one hundred and fifty persons were ill of the natural small-pox. All these, on account of the rapidity of the flames, were obliged to be carried instantly into the fields, where many of them remained several days and nights.

Beds

Beds were laid for them under the hedges, and under the arches of bridges, where, at that season, the ground was dry ; and yet, notwithstanding this sudden exposure to the air, it is a fact, which many people will remember, and can testify, that one person only died, *viz.* a young woman, who was almost expiring at the time when she was removed *.

The above extracts contain the most important information upon this article of cure, and merit the particular attention of every practitioner ; I shall only draw one inference from them, *viz.* That if the application of cool fresh air, had so powerful an influence in rekindling the vital flame, when almost extinguished ; what salutary effects may we not expect from it, when applied to the body in a more early period of the disease, or before matters come to an extremity ?

Although the most signal advantages may be expected from the application of cool air, in every stage of the small-pox,

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* *Ibid.* p. 66, 67, 68.

and especially during the eruptive fever ; yet many cases have occurred, where this salutary expedient has been abused, and material injury done to infants of delicate habits, and even under the advantage of inoculation, by over-driving the cool regimen. It is certain, bad cases sometimes occur, even in this mild method of communicating the disease ; but where the eruptive fever is moderate, and the habit weakly, what good reason can be assigned for stripping children of their ordinary apparel, and keeping them half naked, even in a cold season, not only without a little fire in their chambers, but perhaps opening a window for the admission of cold air ? This is an injudicious application of a noble remedy, by which we protract both the fever and eruption, repel the small-pox from the surface, where the vital powers are weak, and endanger the life of the patient. The same dismally effects take place in young subjects, from early and injudicious bleeding, even with a single leech, or by unnecessary and excessive purging. Thus the application of cool air, may be carried to an extreme ; especially

especially in the mildest small-pox, by which infants of delicate habits are exposed to danger, who kept in their ordinary way, would scarce have one troublesome symptom through the whole disease. We shall now proceed to the *second* indication; namely,

2. *To diminish the excess of the contagious fluids.*

As the accumulation of these contagious matters in the circulating fluids form the proximate cause of this disease, and gives existence to every symptom that occurs; we may easily see, however necessary and beneficial the mode of treatment, laid down under the first indication may be, it is, however, obvious, no part of that treatment is calculated to answer the purposes of the second intention, and this I presume, is a chief reason why the mortality of small-pox continues the same, notwithstanding all the advantages derived from the cool regimen. It is necessary therefore, not only to the mitigation of the symptoms, but to the successful cure of the disease, to reduce the proximate

cause, by diminishing the excess of the assimilated fluids, by which every symptom will be moderated, and the foundation of a favourable prognosis laid, even in many of the worst kinds of small-pox.

If we attend to the operations of nature from the commencement of this disease, we shall find that her chief aim is, the expulsion of the morbid particles; she indeed is not always directed to the most safe and eligible channel for discharging these, but employs the common secretory organs of the machine for that purpose; hence we find a determination of these contagious matters to the skin, either by sensible or insensible perspiration; to the head and salivary glands, to the kidneys, and sometimes to the intestines. No doubt nature relieves herself in part by these discharges, as well as by what is propelled to the skin in the form of pustules; but it is evident from what has been formerly observed, that these are insufficient to discharge the great load of morbid fluids, in cases of extensive assimilation; and therefore we must endeavour, and that seasonably,

seasonably, to assist nature in relieving herself from this load of morbid humours.

We shall take these different discharges under consideration, and shew the advantages as well as the inconveniences attending each of them, by which we shall be able to judge, which is the most safe and eligible, for answering the intention of this indication. I begin with perspiration.

Perspiration in some degree, is common to every kind of small-pox, more particularly in the period of eruption; it generally commences with the eruptive fever, or soon after. It is insensible in the mild kind; copious in the contiguous; and for most part moderate in the confluent, especially if diarrhoea occurs. It evidently contains a portion of the contagious fluids, and of course tends to moderate the eruptive fever, and other symptoms, and certainly lessens the number of pimples. Accordingly we find, when this discharge is altogether wanting, the fever and other symptoms are more violent, and the crop of small-pox more numerous. If gentle

gentle perspiration does not occur after bleeding in this early stage of the disease, it affords an unfavourable prognosis, and with other circumstances, points out the necessity of more blood being taken away. In this case, a few grains of James's powder, according to the age and habit of the patient, or other antimonial preparations, in small nauseating doses, may be given at proper intervals with good effect. The medicine which I have found to be more certain and effectual than any other, for an adult in this case, is the saline julep, with the proportion of one-eighth of a grain of emetic tartar to the dose (two table spoonfuls, or one ounce), given once in two or three hours, according to circumstances.

However salutary this excretion may be, in carrying off a part of the contagious fluids, it is attended with two inconveniences.

1. In preventing a more free application of cool air to the patient. In general, however, after the perspiration commences, it is not easily checked for some days; in which case, though the patient is not able to get out of bed, he ought to be lightly covered,

covered, and fresh air admitted into his chamber from time to time.

2. The patient seldom enjoys the benefit of this discharge longer than the complete eruption of the pustules ; and in cases where the eruption is numerous, while they are advancing to maturation, insensible perspiration may probably suffer a small diminution, which cannot fail to aggravate the symptoms, unless counterbalanced by an increase of other secretions ; in cases therefore, of extensive fermentation, we have but little benefit, and can have no dependence upon this secretion, for giving any effectual relief to the patient, by discharging such an accumulated load of contagious matters, as are generated in the fluids.

The salivary discharge, occurs in all bad cases of small-pox. It for the most part commences during the stage of eruption, or soon after, and points out an extensive fermentation. It accompanies every kind of small-pox where the pustules are numerous, and is generally, though not always, connected

connected with swelling of the head, face, and fauces *.

The generality of writers view this symptom in a favourable light ; no doubt where the fermentation is great, nature will employ this and all the other secretions for her own relief. Sydenham considers it not only as a salutary, but a necessary symptom ; for, speaking of a salivation in adults, and diarrhœa in children, he observes, ‘ Hoc certo scio, quod non solum variolas confluentes plerumque comitantur, sed etiam quod quæ per illas sit evacuatio, tam est necessaria, quam sunt vel pustulæ, vel faciei et manuum intumescentia †.’ And again, ‘ Quandoquidem vero, ut diximus, ptyalismus hanc speciem jugiter comitatur, qui cum e præcipuis sit naturæ evacuationibus, atque hic, in ejus locum, quæ per pustulas fieri debuit, substituatur, (quæ quidem per pustulas evacuatio, in hac specie humili, ac depressione, non æque atque in altera

* See Dr Roger's Essay on Epidemic Diseases, p. 206.

† Sydenham. Op. pag. 138.

‘ altera procedit) summopere annitendum
‘ est ut dicta salivatio in vigore perfret, et
‘ conservetur, nec ante diem suum fistatur,
‘ vel remediorum calidorum usu, vel a ce-
‘ revisia tenui, aut simili alia liquore, libe-
‘ raliter hauriendo, ægrum arcendo *.’

Baglivi coincides with the general opinion of writers upon this subject, and asserts, ‘ quo in variolis maxime sputant,
‘ raro moriuntur, nullumque in variolis
‘ sputatorem vidi mortuum †.’ But daily experience contradicts this assertion ; and Dr Rogers, in his account of the coherent lymphatic small-pox, tells us, ‘ that
‘ a salivation mostly attended them from
‘ the first day of the inflammatory fever,
‘ and continued plentifully through the o-
‘ ther periods of the disease, yet failed in
‘ the relief expected from it, many dying
‘ under this advantage ‡.’

Whatever has been alleged by our best practical physicians in favour of this discharge ;

* Sydenham. Op. p. 154.

† Prax. Med. Lib. i. p. 62.

‡ Essay on Epidemic Diseases, p. 162.

charge ; daily experience shews the great inconveniences, and danger that attends it. The small-pox being left to nature, or even treated upon the most approved antiphlogistic plan; by bleeding, opening the belly, cool air, and a cooling *regimen*, while the proximate cause is suffered to remain in its full force, daily gathering strength, and no attempt made to diminish its excess, it must more and more contaminate the whole fluids, and by the operations of the system, be propelled to the different outlets : In these circumstances, as we formerly hinted, cause and effect act reciprocally upon each other, and never will cease so to act, till the patient's strength is exhausted.

The ptyalism being commonly connected with tumefaction of the head, face and fauces, we find it extremely difficult to get the patient to swallow a sufficient quantity of drink ; and from the weight of his head, he is scarcely able to raise it from the pillow ; hence increase of cephalgia and delirium.

The continuance of fever, after the complete eruption of the pustules, plainly shews

shews the presence of the irritating cause in the system; but if in the commencement of the disease, a reduction of the proximate cause can be obtained, by diminishing the excess of the contagious fluids; the fever will be moderated, and of course the impetus upon the vessels of the head, will be considerably weakened, the salivation will proceed more equably and moderately, and the morbid saliva continue in a fluid state. On the contrary, if the quantity of the contagious fluids is not reduced, the fever goes on even after the eruption is completed, with very little abatement, and the faucial glands being incapable of secreting the saliva in proportion to the quantity of fluids hurried on to these organs, a very slow circulation, or a total stagnation must necessarily follow, by which they are thickened, and rendered more unfit for secretion; and this is precisely what occurs upon Sydenham's *eleventh* day, when the ptyalism in a great measure stops, or from the viscidity of the saliva is discharged with the utmost difficulty, which happening

ing at this critical period, frequently brings on suffocation.

I am therefore obliged to differ in opinion from Sydenham upon this point and instead of viewing the ptyalism, as a necessary discharge, that ought to be promoted and kept up ; I consider it merely as the effect of an extensive assimilation ; and that we shall do a more essential service to our patients, in diminishing the excess of the contagious fluids, by diverting them into another channel ; a practice which employs the sagacity of the physician every day, in cases far less urgent.

Every one knows that this diversion of fluids, from one channel into another, is much easier accomplished in the commencement of a disease, than in its later periods ; it is sometimes the work of nature, but when she is deficient in this respect, it ought to be effected by art.

When the patient is in hazard of suffocation from the viscosity of the saliva, and the difficulty of discharging it, the following gargarism may be of use.

R. Aq. font. unc. viii.

Oxym. scillit. unc. ii. m.

The

The mouth and throat may be washed frequently with this, or it may be thrown in by the help of a common syringe. Upon first observing the saliva to thicken, the application of a vesicatory between the shoulders, has been found useful. Sydenham recommends this application by way of prevention on the evening of the tenth day.

Thus though ptyalism is a resource of nature to free herself from an excess of the contagious fluids, and although this secretion evidently tends to diminish some part of them ; yet the manifest danger that attends it in every bad case of small-pox, does more than counterbalance any advantage we can acquire by keeping it up.

Effects of the Urinary Discharge.

IN every case of extensive assimilation, or where the vital fluid is strongly impregnated with contagious matters, the different fluids secreted from it, will more or less partake of these : The streams must possess

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the

the quality of the fountain from whence they flow. It is of importance, therefore, to promote the urinary discharge through the whole progress of small-pox, but especially in its first stages. This discharge is apt to be impeded, by the fulness and distension of the vessels,—the ardent heat,—by the perspiration when profuse,—and by the horizontal posture; but bleeding and laxative clysters, the light thin cooling diet, flummery, fruits, and subacid drinks, formerly directed, have all a tendency to promote this secretion, though we cannot expect from it any considerable reduction of the proximate cause.

The learned Doctor Mead, recommending the cooling vegetable diet in this disease, with drinks of the same nature, observes, ‘*Medici Arabes, si hac diæta non satis solveretur venter, mannam adjiciebant; moderate tamen et caute. Necesse enim omnino est, inquit Avicenna, in principio lubricam esse alvum.*’ Cui sapientissimo monito nullum utilius in hoc morbo curando dari poterit; si modo illud adjungatur, quod oportet semper copiose fluat urina. Mirum enim est cuti cum renibus

‘bus confortium; quo fit, ut facillime per
‘hos expurgetur, quicunque humor per
‘illius glandulis secerni solet, convenit er-
‘go, ut per has vias ducatur, quantum
‘potest morbi materia, ne partes interne
‘graventur *.’

The last secretion mentioned, was diarrhoea.

Effects of Diarrhoea.

Diarrhoea frequently accompanies the contiguous, simple confluent, putrid and crystalline small-pox in adults, as well as in children. It does not always arise from the biliary, or corrupted contents of the stomach, as it frequently occurs, after that viscus has been sufficiently emptied by vomiting, and sometimes commences with the eruptive fever, or soon after, especially if the patient does not perspire. It indicates an extensive fermentation of the fluids, and is one of the principal discharges employed by nature, in disbur-

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dening herself from an excess of the contagious matters.

For a long time, the dread of encouraging this evacuation prevailed both among the learned and vulgar, lest the morbid particles should be diverted from the surface; but where fever subsists in any considerable degree, we need not apprehend any danger by the translation of the morbid fluids, from the external to the internal parts. And from what daily occurs in bad small-pox cases, we not only see the whole skin covered with pustules, but find a continuance of fever, after their eruption is completed, a sure evidence that the proximate cause is not wholly dislodged from the circulating fluids; this doctrine is demonstrated from what we observed, p. 87. of the practice of the Bramins of Indostan, when after the pustules have been punctured, and emptied seven or eight times, yet they always fill again, which clearly shews, there is often a much greater quantity of contagious particles in the blood, than can be contained in the pustules: And as these morbid fluids cannot be suffered to remain in

in the system, they must be discharged by different excretions.

We have considered the inconveniences attending perspiration, and the danger that generally accompanies swelling of the head and ptyalism ; and have observed, that neither of these, however great and long continued, are sufficient to carry off the excess of the assimilated fluids ; nature, therefore, frequently finds another vent by the intestinal canal ; and perhaps there are none of the ordinary excretions, capable of discharging a larger quantity, and with less obvious injury to the system in general, than this one ; we are taught this lesson, both in the small-pox and other diseases ; but physicians have been so fearful of making a revulsion from the skin in this distemper, that if they are brought to direct a lenient clyster at this early period of the disease, it is the farthest length some will go, and many are even afraid to go so far ; of this number was Morton, cotemporary with, and an opposer of Sydenham in the cool regimen ; of whom Van Swieten in his Commentary observes, ‘ Mortonus adeo inhæ-

‘ rebat huic opinini, ut scripserit, se ab al-
‘ vo usque ad vigesimum diem constipata
‘ in hoc morbo nullam noxam haetenus
‘ deprehendisse, praeter molestam foceum
‘ nimis induratarum egestionem circa fi-
‘ nem morbi. Interim non levem moles-
‘ tiam inde nasci, fatetur ipse alio in loco.
‘ Sic autem habet. *Novi mulierem (cui al-*
‘ *vus per octodecim dies constipata fuerat),*
‘ *quam, nisi egerendi pene confectam, nec cly-*
‘ *steris, glandis, vel fotus, ope a fæcibus indu-*
‘ *ratis liberare potui, donec sphincter ani specu-*
‘ *lo sensim dilataretur, et stercora forcipibus*
‘ *contracta vi extracta fuerint.* Credo, quod
‘ nemo prudens facile exponere vellet æ-
‘ gros tantæ calamitati, et diris malis, quæ
‘ violentam, talium saccum educationem se-
‘ qui solent. E contra adeo metuebat di-
‘ arrhœam, præsertim torminosum, in quo-
‘ vis morbi stadio, potissimum circa tem-
‘ pus eruptionis, ut illam symptomaticam,
‘ et plane deleteriam, crederet, illico sisten-
‘ dam, illa paragorici quantitate, quæcumque
‘ fuerit, qua scopis attingi potest. Multos
‘ certe sequaces habuit Mortonus, et non
‘ sine luctu recordor, quod nullo modo
‘ persuadere potuerim medicis, qui illus-
‘ trem

' trem ægram, in ætatis flore variolis con-
' fluentibus decumbentem, tractabant, qui-
' bus periit undecima die, ut vel semel al-
' vum, toto morbi tempore strictam, mo-
' lissimo enimata injecto ducerent. Gau-
' deo tamen, plures recipuisse, postquam in-
' nocuum mollium clysinatum usum repe-
' titis experimentis viderant, &c. *.

From reviewing the practice of Morton, and other alexiphamic physicians, we would be apt to consider the small-pox to have been a different disease from what it is at present, and to have required a method of cure directly opposite to what it now requires; they must surely have imagined the costive habit to be a real advantage in the cure; but as this habit could not take place in the best constitution, even exempted from disease, without manifest injury and hazard; what pernicious consequences must accompany it, in a person labouring under universal inflammation, fever, and other violent symptoms, for such a length of time. A practice of this kind establishes one truth, that in all

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cases,

* Comment. in H. Boerhaav. Aphor. 1394. p. 75, 76.

cases, however bad, where the Almighty determines life, it is not in the doctor's power to kill.

Sydenham appears to have seen the propriety of Diarrhoea, and even of purging in certain kinds of small-pox, but was deterred from the free use of it by the common prejudice. ‘*Licet enim vulgare illud atque tralatitium argumentum, quo adversus phlebotomiam, aliasque evacuationes, utuntur, (nempe quod non liceat a circumferentia ad centrum movere humores, cum natura in hoc morbo contrarium affectare videatur,) nullarum plane virium sit; eo quod ex earundem usu contrarius omnino effectus, subitanea scilicet variolarum eruptio saepissime consequi deprehendatur; aliæ nihilominus rationes in promptu sunt, quæ vehementer suadent, ut, siquidem ullo modo vitari possit, ab hac praxi manus abstineamus.* Nainque (ut earum præcipuas paucis adtingamus), per hasce evacuationes, non tantum ebullitio nimis imminuitur, cuius interim ope partes defumandæ adcurate, secerni debuerant, verum etiam illud ipsum subducitur, quod captæ secretioni quasi pabulum continentur’

continentur suppeditaret; unde sæpenero contingit, ut variolæ primum lraudabili impetu erumpentes (eoque fortasse melius, quod evacuationes jam dictæ præcesserant), paulo post ex improviso quasi repercussæ detumescunt: idque ob eam potissimum causam; quod materia desit, quæ quasi a tergo præeuntem infesteretur, atque agmen clauderet *.

In another place, he says, ‘ Proximo loco, cum, in variolis *confluentibus*, haud minus certo *infantes diarrhœa* comitetur, quam *adultos ptyalismus*. Natura, ut supra ostendimus, alterutram harum evacuationum materiæ morbificæ eliminandæ, ubique constitente; ut nec hic ptyalismo, ita neque istic *diarrhœæ* frænum injicio; cum utrumque ex æquo sit absurdum. Male locata interim imprudentiam aliquot muliercularum opera, insistenda hujusmodi diarrhœæ, multa infantium millia leto dedit; dum falso secum reputant, diarrhœam par in *hac variolatum specie*, atque in distincta discriben adportare; nesciæ scilicet, illic tantum,

* Syden. Op. pag. 145, 146.

‘ tantum, officere diarrhœam, ubi per
 ‘ pustulas fit evacuatio, hic vero naturæ
 ‘ opus illam esse, morbo effugium quæ-
 ‘ rentis *.’

In these quotations, notwithstanding Sydenham's caution, he gives a strong testimony to the utility of the diarrhœa in confluent small-pox, and even of promoting this evacuation when it is slow, or altogether wanting; but his *first* reason for refraining from the practice of exhibiting purgatives, appears to be one of the best arguments for the use of them (if by ebullition, he means the eruptive fever), the moderating of which, must be of the greatest advantage in the subsequent disease, especially where we have reason to apprehend an extensive assimilation. And his *second*, can only do hurt in those cases where purging would be highly improper, *viz.* in weakly habits, and where from the appearance of the symptoms, we have no reason to look for a violent disease.

Hoffman favours an open belly in this disease; and mentions one of his patients who

* Syd. Op. p. 156.

who laboured under diarrhoea during the whole course of the distemper. He likewise takes notice of an observation of Lusitanus, that of one hundred and fifty children he attended in the small-pox and measles, in the course of one summer, ‘ all whom he was permitted to evacuate, recovered ; but those whose parents would not suffer him to give this relief, died *.’

Though Boerhaave does not expressly enjoin purging in the early stage of small-pox, yet the general antiphlogistic course he directs, Aphor. 1394, &c. with a view to the resolution of the small-pox, (as he calls it) shews, that he considered an open belly useful in this period ; for which purpose, he prescribes the nitrum stibiatum, sal polychrest, &c. ; but in his letter to Bassandus, first physician to the Emperor, dated 30th April 1736, a copy of which, Van Swieten has inserted in his Commentary † ; he there shews by his practice in two very remarkable cases, of how much importance

* Med. Rat. Syst. tom. iv. sect. 1. ch. vii. p. 156.

† Comment. in H. Boerhaav. Aphor. vol. v. p. 71.

importance the purging course was in the treatment of small-pox. As these cases, therefore, are a strong testimony for this practice, I shall give an abstract of the most material parts of them.

‘ Juvenis viginti duos annos, natus in
‘ India, robustus, dives, luxui perdite de-
‘ ditus, vino electis inde spiritibus, opipa-
‘ ris mensis, pergræcationibus, exercitiis
‘ immoderatis, uti suetus, media æstate,
‘ debacchatus solito jam immanius, hinc,
‘ febre ardente, dolore capitis summo, vo-
‘ mitu assiduo, angore terribili, inquietu-
‘ dine perpetua, somno turbulentissimo,
‘ pressus, Amstelœdamo Leydam vehitur
‘ velocitur, ut consilia petat.

‘ Nihil de variolis suspicans, mitto san-
‘ guinem largiter, ocyssime. Statim pur-
‘ gans de cremore tartari, nitro, pulpa ta-
‘ marindorum rheo, exhibeo dosi larga:
‘ id rite purgavit:—ad sitim vero, qui in-
‘ satiabilis illi erat, utebatur aqua cum
‘ succo recenti preffo limoniorum, cum
‘ pauxillo succi ribesiorum et syrupo vio-
‘ laceo: addebatur subinde et pauxillum
‘ vini Mosellani. Decumbebat in lectica
‘ aperta, corio Russico obducta, in cubi-
‘ culo

culo temperate frigido, apertis semper portis. Contra omnia hæc insurgebat atrocior morbus: urina flammea, æstus exurens, profusus sudor, somnus fere fribundus; lingua sordide fusca, taurini oculi, igne et sanguine suffusi. Itaque die sequenti, nondum apparentibus indiciis variolarum, eadem omnia æque liberè repeto: neque prohibebatur adscensio increcentis per oninia mali. Sed paulo post omnis conspicua totius capitidis pars, ubique, minutissimis punctulis rubris, proxime junctis foeda, oculi lachrymantes, rubri, sternutatio, tussis: unde videbam variolarum confluentium teterimam speciem. Serio, diu, meditatus, gaudeo acta, quæ inflammationi adversa; metuo suppurationis, et gangrænæ, dira ventura effecta; his cavendis invigilo: mane et vesperi pediluvia ex aqua et vi- gesimo parte aceti, cavis pedum et pop- litum fermentum panis acidum, aceto et nitro permistis, noctes diesque apllico.—Jubeo sedeat erectus, quantum ferre potest. Decubitus in lectica, loco obscurissimo, modice frigido, silentia muta ministrantium, impero. Decoctum avenæ

‘ avenæ in aqua, cum succo limoniorum
‘ gratum, lac ebutyratum coctum cum
‘ avena, cerasa nigra acidula (morelles)
‘ contusis cum suis nucleis, in sero lactis
‘ cocta, per setaceum pressa, paucō fac-
‘ charo grata, cum intrito pulvisculo pauca
‘ panis biscocti, pro cibo exhibeo, nec
‘ aliud dari passus sum. Potus erat caffē
‘ cum $\frac{1}{4}$ lactis, Thea bouhi cum $\frac{1}{3}$ lactis, ce-
‘ revisia Mol. serum lactis, aqua pura cum
‘ pauxillo succi limonum. Decoc̄to tama-
‘ rindorum supra descripto utebatur toto morbi
‘ decursu, ea quotidie copia, ut semper quater
‘ interdiu alvum laxaret, usque ad quartam
‘ decimam morbi diem. Post meridiem, ho-
‘ ra tertia quotidie sumebat haustum sopo-
‘ ratum, ex aqua stillatitia, flor. Rhœados
‘ unc. iii, opii puri gr. ii, sp. sulph. p.
‘ camp. gutt. vi, syr. violar. dr. iv. Accef-
‘ sere interim deliria, furores, convulsiones
‘ diræ, obmutescentiæ: perrexī semper
‘ eodem modo.—Sæpe utebatur ad asperi-
‘ tatem dolentes gutturis emulsis ex iv.
‘ sem. frigid. maj. et amygdalis cum syr.
‘ altheæ Fernel, gargarismata assidua ex
‘ decocto ficuum: erant enim omnia obsessa
‘ et ulcerata eo usque, ut omnis corporis
‘ cutis

‘ cutis una tantum foret exulcerata crusta:
‘ quam post diem undecimam, jam penitus
‘ aridam quater interdiu olea recens presso
‘ de amygdalis opime inungendam curavi.
‘ Sensim tunc vino Rhenano, jure carni-
‘ um, refocillans vires, omnia superavit
‘ mala. . Vivit usque.

‘ Legati galloruin uxor, sex menses gra-
‘ vida, correpta virulentissimis variolis, se-
‘ cunda statim die effusissime erumpenti-
‘ bus, cum pessimis symptomatibus, ma-
‘ xime in cerebro, missu sanguinis liberali
‘ statim facto, decoctis similibus utens, ut
‘ bis quotidie alvum deponeret, opiatu ves-
‘ peri ad gr. i. similibus pulveribus omnique
‘ alio regimine ut prius, tractabatur. Huic
‘ tamen pultes avenaceæ, jura vitulina levi-
‘ ora cum diu incocta oriza, cerasa recentia
‘ cocta in lacte ebutyrato cum pauco pane
‘ biscocto, largius oblata, respectu fœtus.
‘ In illa tanta variolarum vis, ut prorsus
‘ incredibile. Sanata integre. Tempestive
‘ pulchrum enixa filium, non passum va-
‘ riolis in utero.’

Doctor Mead. ‘ Misso, quantum expe-
‘ dit, sanguine, ventrem purgare convenit;
‘ quod quolibet ante pustularum eruptio-
‘ nem

‘ nem die satis tuto fieri potest. At leni
 ‘ tantum medicamento uti oportet ; cujus-
 ‘ modi est infusio senæ, adjecta manna ;
 ‘ aut in pueris præsertim, manna sola *.

‘ Convenit autem in omnibus hujus
 ‘ morbi generibus, ut sub finem, die nimi-
 ‘ rum nono aut decimo, alvus moveatur.
 ‘ Febris enim putrida hoc tempore exares-
 ‘ centibus pustulis, aut (si nulla sit suppu-
 ‘ ratio) tumore inflamatæ cutis subsi-
 ‘ dente, plerumque supervenit ; quæ nulla
 ‘ alia medicina tutius depellitur. At le-
 ‘ nioribus tantum catharticis hic opus est,
 ‘ qualia ante eruptionem pustularum adhi-
 ‘ benda proposui.

‘ Rem hanc omnem in epistola ad cla-
 ‘ riff. Freindium olim explicui, et exemplis
 ‘ allatis illustravi † ; quam ille postea auc-
 ‘ toritatibus medicorum, cum veterum
 ‘ tum etiam recentiorum, abunde confir-
 ‘ mavit. Quibus omnibus si quis assentire
 ‘ nolit, nae is in sole vult caligare. Ha-
 ‘ bent sua tempora quæque febres, et ubi
 ‘ vis

* De Variolis, cap. iii. p. 37.

† Vide Freind. Comment. vii. ad Hippocrat. de
 ‘ morb. popularibus, et epistolam, de purgantibus in se-
 ‘ cunda variolarum febre adhibendis.

‘ vis venenata humores semel corrupit, *vix*
 ‘ festinantur satis putridus morbi fomes *ex cor-*
 ‘ *pore ejici potest.* Et quotidie quidem vi-
 ‘ denius, hac cura omissa, febrem hecti-
 ‘ cam, cum tussi pus trahente, spiritus dif-
 ‘ ficultate, aliisque pulmonis male affecti
 ‘ indiciis, statim subsequi *.

‘ Edidit A. D. MDCCXVII. Vir doctissi-
 ‘ mus Johannes Freind, *Hippocratis de mor-*
 ‘ *bis popularibus librum primum et tertium, qui-*
 ‘ *bus novem de febribus commentarios accom-*
 ‘ *modavit.* Ex his *septimus est de purga-*
 ‘ *tione in febre putrida, quæ variolis confluen-*
 ‘ *tibus supervenit.* Huic autem, ad senten-
 ‘ *tiam suam confirmandum, epistolas qua-*
 ‘ *tuor medicorum ad se datas adjunxit; in-*
 ‘ *ter quas uni præbuit locum quam a me*
 ‘ *acceperat.* Etenim postquam per annos
 ‘ bene multos in nosocomio *Divi Thomæ*
 ‘ *Londini medecinam feceram, anno*
 ‘ *MDCCVIII, observavi nonnullos variolis,*
 ‘ *quæ maxime pestiferæ videbantur, labo-*
 ‘ *rantes, cum alvi fluxus nono aut decimo*
 ‘ *morbi die, vel interdum citius, eos exer-*
 ‘ *cuislet, præter spem incolumes evadere.*

O

‘ Hinc

* De Variolis, cap. iii. p. 47, 48.

‘ Hinc igitur, quid ad illos juvandos, quibus hac ægritudine correptis alvus per totum morbi tempus adstricta esset (id quod in plurimis usu venit) leni medimento sub finem facta ventris solutio valeret, et experimenti consilium cepi. Res ex sententia successit, et multos, quibus maximum imminebat vitæ periculum, hac medendi ratione salvos praestiti.

‘ Erat mihi tunc temporis, et quidem ad extremum usque vitæ ipsius terminum, amicitia conjunctissimus dictus modo clarissim. Freindius; utque assidue fere inter nos de rebus medicis sermones habebantur, illi rem hanc exposui, qui factum laudabat. Et cum non multo post ipse, una cum aliis duobus magni nominis medicis, nobilem quendam juvenem gravissime variolis oppressum curaret, in animam habuit medicinam hanc experiri. Illi autem pertinaciter repugnare pergebant; donec tandem die eruptione pustularum decimo quarto, cum ad extrema jam ventum esse testarentur convulsiones cum veterno ingruentes, ut leni potionе solveretur venter, concederent:

• concederent: quod magno cum levamine
• factum est. Hanc igitur repetere voluit
• Freindius; quod cum non permitteretur,
• septimo post die vi morbi victus occu-
• buit æger.*.

Tiffot, ' Unicam de purgantibus addam
observationem. In confluentibus, et nū-
merosis discretis, a primo impetu febris
suppuratoriæ mannam adhibeo scopo
purgandi et sœpe alvum ter, quater, quin-
quies deponere jam nona morbi diei
coëgi, nec sequentibus cesso. Nunquam
hujus methodi pœnituit. Video tamen
omnes alias medicos serius purgare ; at
spes est contradicentes haud inventuram
citam purgationem, quam suasit ratio,
numerosa confirmavit experientia. In
mitioribus purgo simul ac flavescit fa-
cies, et faustius succedit quam sit, ut
mos est tantum non omnibus exsiccatio
expectatur.

‘ Has tempestivas purgationes sequelas
‘ morbi impedire certus sum, et plus sane
‘ in hunc scopum valet una hoc tempore,
‘ dum mobiles adhuc facile fluunt hu-

O₂ mores.

Præfat. ad lib. de Variolis, p. 1, 2, 3.

‘ mores, quam tres aut quatuor feriores *.’

Dr Thomas Simson, late professor of medicine in the College of St Andrews, speaking of the abuse of syrup of poppies in small-pox, observes, ‘ What more just and natural in a disease abounding with putrid matter, than gradually to make a subtraction of it, and to keep an open belly, rather than to dam up the whole secretions, the native effect of this syrup? But it may, perhaps, be replied, That by this means, the hands, face, and the pustules themselves, would be made to subside, before the blood was duly purged from the infection. This, I suspect, has been the reason why evacuations of all kinds have been so much objected against in the rise of the small-pox.—What can we expect when the body is all over œdematos, with a fever, but deliriums, peripneumonies, extravasations of blood, &c.

‘ To evite these, was the view with which I first became sparing in the use of

* *De Variolis, &c.* p. 46.

‘ of the white poppies ; and which since
‘ has made me venture, through the whole
‘ time of suppuration, to procure to my pa-
‘ tients the ordinary course of their belly
‘ at least : and I must inform you, with
‘ most agreeable success ; for I never find
‘ the small-pox keep up better, and the
‘ patient easier, than under this regimen.
‘ So that I had between three and four
‘ dozen this same year, most of which
‘ were of the coherent kind, and some
‘ confluent, few of which had so much as
‘ the appearance of a fever upon the turn
‘ of the disease. They drank small beer
‘ and whey, and ate boiled prunes at plea-
‘ sure. In the mean time, in small fisher-
‘ towns, under no physician’s care, I have
‘ known eighteen or twenty die of the
‘ same small-pox, where scarce twice that
‘ number had been infected ; which in
‘ all their symptoms, agreed much with
‘ what the diligent Dr Huxham describes
‘ as raging at Plymouth, in the years
‘ 1724, 1725, (Philosophical Transactions,
‘ No. 390.) And what surprise is it they
‘ should make so much havock, when per-
‘ haps from the beginning to the end of

‘ the disease, the patient is not allowed
‘ one stool ! Boiled milk and water, groat
‘ gruel, and syrup, making up their ma-
‘ nagement.—To infants, this manage-
‘ ment must be still more fatal, for they
‘ at no time can be easy under constipa-
‘ tion, and yet these are handled the same
‘ way. I have found them five or six
‘ times a-day at stool, with the best effects.
‘ Nor did I ever see a sudden collapsing
‘ of the swelled parts, by insisting on this
‘ method, I mean by keeping up the natu-
‘ ral course of their belly, or even making
‘ them more open, when an excessive swel-
‘ ling calls for it ; under which, *Dr Mead*
‘ observes in his letter to *Dr Freind*, you
‘ will often find them expiring : and there-
‘ fore, I have always made it one part of
‘ my management, even under the rise of
‘ the small-pox and suppuration, to keep
‘ it at under *.’

Dr Wintringham enters into the same idea, and declares he never saw any ill consequence from a diarrhoea in this disease, but, on the contrary, always found

* *Medical Essays*, Ed. iii. vol. vi. p. 92, 93, 94.

found this evacuation of the greatest use *.

Dr Hillary speaks much the same language, but has a notion, ‘ That the looseness attending children in this disease, ‘ is not so much owing to a spontaneous ‘ tendency of the humours to the intestinal glands, or from a weakness of these; ‘ as it is the effect of the *miasmata*, or putrid matter, secreted from the blood, ‘ and discharged with the saliva, which ‘ being swallowed, and passing into the ‘ stomach and intestines, stimulate their ‘ tender coats, as purgatives do, and so ‘ causes a looseness, and therefore, is something more like art, than a critical discharge of nature. This, (says he) I shall not assert, but leave it to further observation. But which way soever it be, ‘ as this looseness is salutiferous, nature thereby (as well as by hæmorrhages) shews us the way we ought to follow ‘ her †.’

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* Comment. Nosolog. p. 63.

† Practical Essay on the Small-pox, p. 119, 120.

Dr Dimsdale is of the same opinion, and comes nearer the point upon this subject, than any other author I have met with, in his *present method of inoculating for the small-pox*, to which are added, some experiments, instituted with a view to discover the effects of a similar treatment in the natural small-pox.

‘ The very great relief which persons under inoculation experience from fresh air, cold water, and evacuations by stool, during the fever preceding eruption, soon determined me to make trial how far the like treatment might be useful to those who might be seized with the small-pox in the natural way; more especially in such cases, where, from the violence of the symptoms, a confluent kind was justly to be apprehended.

‘ In several instances where I have been concerned, and where the symptoms and other concurring circumstances, induced me to think the small-pox was at hand, I have directed the like management as I recommend to inoculated patients *.

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* See Cases xxiii. xxiv. xxviii.

‘ I have been called also to others at the time of eruption, where some pustules having already appeared, made the matter clear; and in every case of this kind, I have endeavoured to get the sick person into the open air, having generally given the mercurial and antimonial pill, and directed a laxative to be taken some hours after it, in order to procure three or four stools; and this method I have more particularly enjoined, and sometimes repeated, where the kind has appeared to be bad, and where little or no relief has been found by the partial eruption, the symptoms continuing to be such as portended great danger. I have followed the same method during every part of the eruptive fever, intending thereby to abate its violence, to check the eruption, and prevent the conflux, and consequently the danger *.

‘ The success attending this practice, has hitherto exceeded my expectations, though it must be confessed, that as the symptoms run much higher in the natural,

* See Cases xxv. xxvi. xxvii. xxviii. xxix.

' ral, than they are found to do in the
' inoculated disease, the relief has not
' been so considerable. Among those who
' have been treated in this manner under
' my own care and inspection, not one
' has died, and the number amounts to
' about forty,' &c.*.

Sir George Baker: ' It appears, from
what has been premised, that the use of
purgatives, regulated by discretion, is
capable, under certain circumstances,
of lessening the violence, and averting
the danger of the small-pox. It appears
likewise, that the same medicines given
injudiciously with respect to time or
quantity, and without due attention to
the strength and habit of the patient,
have produced very ill effects. In so
critical a situation, by what rules shall
the physician determine his conduct? by
none which can easily be described.
Here, therefore, especially is the use
and importance of a man of skill; delibe-
ration, and judgment †.'

Children

* The present method of inoculating for the small-pox, p. 61. 63, 64.

† Observations on the modern method of inoculating the small-pox. Medical Transactions, vol. ii. p. 303, 304.

Children, from the natural laxity of their habit, are more disposed to an open belly, and even to diarrhoea, than adults, especially when the vessels are oppressed; or over distended; and much more so, when the fluids are replete with contagious matters, upon which account, we find the diarrhoea more frequently occurs in these young subjects, when the faucial glands are noway affected.

I have adduced these testimonies to show, with how much caution these physicians proceeded in the use of purgatives; the fears they entertained, and the occurrences which pointed out their utility; this timidity could only arise from not having a distinct view of the proximate cause; however, these examples, from men of eminence in their profession, though not founded on any just principle, are sufficient to fortify the mind against the dread of purging in the worst cases of small-pox. It is not an easy matter to overcome old prejudices; but men of observation and attention will improve every

every hint, whether for their own successful practice, or the public good. With what labour and difficulty were we driven from the hot regimen, which, if it did not absolutely destroy many lives, (though it would appear from all of the cases we have recorded, that it did) yet we are persuaded, by that treatment, thousands suffered more through the course of the disease, than was necessary. It is a question, Whether a greater proportion of mankind were cut off towards the end of the last century, and beginning of the present, when that mode of treatment was more general, than in the same period of time, since the cool regimen was more universally practised ? The bills of mortality, so far as we can depend upon them, do not show such a disparity in the proportion of deaths, between the above periods, as might be expected from the present improved method of treating the disease, which clearly evinces, that the advantages resulting from the antiphlogistic regimen, have had no influence in reducing the mortality of small-pox ; nor can it possibly have, though

though carried to its utmost extent, unless we are able, by proper means, seasonably to diminish the excess of contagious matters in the system, the immediate cause of every dangerous symptom that occurs in all the worst kinds of small-pox ; and this seems to be more easily and safely affected by purging, than by any other excretion.

As to the use of purgatives, either in inoculated small-pox, or in the mild disease, by accidental infection, I consider them not only to be unnecessary, but in most cases of both kinds, extremely hurtful. In foul gross habits, in view of inoculation, I have been in the use of giving a few grains of mercurius dulcis at bed-time, twice a-week, with a gentle purgative the following morning ; and this course, I have continued with the best effects for some time, till I perceived a sensible change in the habit ; but in ordinary cases, where an infant appears to enjoy perfect health, I can see no advantage arising from evacuations of any kind, either before, or during the disease, except cooling the body, by a laxative clyster from time to time.

C H A P. X.

Treatment of inflammatory Small-pox.—Objections to this Plan of Treatment, answered.—Treatment of putrid Small-pox.—Of crystalline Small-pox.

UNDER this head, is comprehended both the contiguous and simple confluent small-pox ; but before entering upon this part of my subject, I shall premise a short account of the reasons which induced me to alter my mode of practice, in the treatment of small-pox, and to adopt a method of cure, which has been attended with the best effects.

I saw the great advantages resulting from the cooling regimen, in almost every inoculated patient, and I determined to apply this regimen, in its full extent, to all the worst cases of small-pox. My hope of success was rather too sanguine ; for after repeated trials, I found the cool regimen

regimen carried to its utmost latitude, had not that powerful influence, either in alleviating the severity of the eruptive symptoms, or in preventing so large a crop of small-pox, as I expected. The general antiphlogistic regimen, with the application of cool air, however beneficial in common fevers, and admitting that it might go a certain length in moderating the eruptive fever of small-pox, by curbing the progress of assimilation in the system; yet in all cases, where the violence of the symptoms pointed out this assimilation to be extensive, the above regimen was not possessed of powers sufficient to subdue the dire symptoms which now occurred. Indeed, when we attend to the true cause of these symptoms, namely a load of contagious humours irritating the nervous and arterial systems, we may easily perceive they could not be essentially relieved by the cool regimen; for, as I afterwards found, that even the carrying off a part of this cause in the commencement of the distemper, did not produce such a mitigation of the symptoms as might have been expected; we have far less reason to suppose,

suppose, that a patient, in these circumstances, could receive essential relief from any mode of cure whatever, while the proximate cause was suffered to remain undiminished in the habit.

In short, I found, that, in treating the various kinds of bad small-pox, with all the advantages of the cool regimen, and superadding thereto plentiful evacuation, by bleeding, and a laxative clyster from time to time ; I never was sensible, by the strictest attention to this regimen, of the crop of small-pox being lessened, for the pustules were often as numerous as the skin would admit of, with little or no remission of the eruptive fever ; and I am persuaded, this method of cure is the best that is generally practised. It is true, the large and well ventilated chamber, the light covering, the cooling fruits, and subacid drinks, were highly agreeable to the patient, but they made very little sensible impression upon the disease, in moderating the bad symptoms ; the same excess of contagious matters appeared in a numerous eruption of pimples, and there was
very

very little abatement of the eruptive fever through the course of the disease.

Repeated disappointments in this way, led me almost to despair of success in the cure of bad small-pox ; but I still pursued the cool regimen, as the most rational plan that occurred, till I found, by observation, what was further necessary to render it more complete.

In every case of small-pox, where the diarrhoea was considerable, especially if it appeared early, I observed not only the pustules to be less numerous, but the fever, and other symptoms, to be more moderate, particularly the swelling of the head. This led me, in all cases where the symptoms indicated an extensive assimilation, and a highly inflammatory disease, to substitute early purging where no diarrhoea occurred. I was encouraged in this practice, by the uncommon foetor of the patient's stools, even in the commencement of the eruptive fever, which led me to consider these discharges to be salutary, as containing a portion of the contagious fluids. This practice, I considered as no way inconsistent with

the antiphlogistic plan of cure, but rather subservient to it; and therefore, in all cases where symptoms of high inflammation appeared, immediately after bleeding, if the patient's belly was slow, or if he was naturally of a constive habit, I directed a laxative clyster. If these operations had taken place in the morning of the first day of the eruptive fever, I followed them immediately with a cooling purgative, and generally used for this purpose the *infusum tamarindorum cum senna* of the Edinburgh Pharmacopœia, to which was occasionally added a little sal polychrest. manna, or syr. rosar. pall.; this was given in small doses, till it procured four or five stools; but if the bleeding and clyster were employed in the evening, I delayed giving the purgative till next morning, which, if diarrhoea did not occur, was repeated daily through the course of the disease.

By these artificial discharges, the immediate irritating cause of all the eruptive symptoms, was gradually reduced, and, of consequence, these symptoms were moderated, and a determination of a considerable quantity of the contagious fluids prevented

prevented from rushing, both to the head and surface. The good effects of the purging course, frequently did not appear so obvious at first, in many bad cases, where the eruptive symptoms were violent, but sooner or later its efficacy did appear, by which I came to be fully convinced, that the early use of purgatives, in the worst cases of the disease, by accidental infection, was much more pertinent, than in the benign kinds of small-pox ; in the first, its good effects were sooner or later visible ; in the last, often hurtful.

The success I found attending this plan of treatment, confirmed the theory laid down in the preceding part of this work ; indeed, a considerable part of that theory was founded upon the success attending this method of treatment, so that the theory and practice elucidated each other. But as many physicians, and other practitioners, have been long under a rooted prejudice against early purging in the small-pox ; for the satisfaction of such, I shall endeavour to answer some of

most material objections that may be made to this practice.

Objection 1. In the commencement of the eruptive fever, Sydenham, and all who implicitly follow him, will object to this plan of cure, from nature being interrupted in the period of ebullition and concoction, by hurrying off these crude and unprepared humours too early to the bowels.

Answer. It appears from what has been formerly observed, that the assimilation of the fluids proceeds slowly and imperceptibly during the stage of fermentation; and that it is the accumulation of these contagious particles that gives rise to the symptoms which precede eruption. It is not therefore necessary, that the assimilated fluids should undergo any further concoction, to fit them for expulsion to the surface. The commencement of the fever, and other symptoms, show they have acquired a sufficient degree of preparation, when they are capable of stimulating those powers which propel them to the skin, as well as to the different excretory

cretory organs: And it appears to be in proportion to their quantity, or degree of virulence, they are retained a longer or a shorter time in the system of circulating fluids. Hence, in the mild small-pox, the pimples do not appear till the third day, but in malignant kinds, much sooner. The assimilated fluids have no appearance of ripeness or maturation, by their longer continuance in the circulating mass, but are in the same condition in which they appear soon after eruption, *viz.* a thin pellucid fluid. If we had the art of detaining these contagious matters longer in the system, in order to their better concoction, we should certainly increase the disease, by laying a foundation for their greater multiplication. We know of no condition necessary for the assimilated fluids to undergo, to render them fitter to be expelled by the fever, than they at present possess, which cannot affect their quality, though it must necessarily increase the quantity of those morbid matters. This consideration, therefore, is an argument in favour of early purging, as the sooner these assimilated

milated fluids are discharged, the sooner we may expect a mitigation of fever, and other eruptive symptoms.

Objection 2. The eastern practitioners have made this objection, *viz.* That evacuations of every kind are improper and hurtful in this disease, as they divert the course of the contagious humours from the skin in pustules, which is always their natural termination.

Answer. The practice of the Bramins, as formerly observed, is truly ingenious, and shews their perfect understanding of a part of the theory of the disease, *viz.* That the assimilated fluids, in all bad cases of small-pox, is far greater than even a numerous crop of pustules are able to contain; hence, by a persevering diligence and assiduity, they perforate and empty the ripe pustules, and suffer them to fill again repeatedly, while any contagious matters remain in the body. But it is obvious, they could not possibly engage in this labour of emptying the pustules, before the seventh day of eruption, as we must suppose the suppuration to be considerably advanced, before

before this operation could be performed with effect; and it would be necessary the pustules should be of such a size, as when emptied by the puncture, to contain a quantity of the pus, which they could not do in the very early state of the pustules. From this delay, many dire symptoms must occur before the sixth or seventh day of eruption; the swelling of the head and face, as also the ptyalism, are usually far advanced before this time, and it is of much importance to have it in our power to obviate these ugly and dangerous symptoms at an early period. The fluids are more easily diverted into another channel at first, than after a habitual course for some days, to a particular part. The Bramins, whatever knowledge they have acquired of the proximate cause of small-pox, like ourselves, appear to be too much fettered by the prejudice of education and custom, and do not seem to apprehend, that the course of several fluids may be diverted with the greatest success, from a hazardous, into a safer channel; thus we see an increased secretion of the mucous glands of the trachea diminished, by increasing

creasing another discharge by the kidneys, and even lymph deposited in the tela cel-lulosa, producing universal ana-sarca, by the powers of medicine, absorbed and carried off by the same channel. This diversion, whether of increased secretion or morbid fluid, from one place to another, is far more easily accomplished in small-pox, both with respect to the patient and physician, than having recourse to the Asiatic practice of puncturing the pustules, besides the evident advantage of inducing it at a more early period of the disease.

Objection 3. By pursuing the purging course, before the appearance of pustules, may we not prevent their eruption altogether, and so endanger the life of the patient?

Answer. The violence of fever and other eruptive symptoms, are certain indications of an extensive fermentation, and of consequence, (with very few exceptions), presage a bad kind of the disease. Sydenham observes, ‘ Symptomata cum discretis communia habet et illa variola-rum species, quas confluentes adpellavimus, nisi

nisi quod hic atrociora sint omnia: Febris scilicet, anxietas atque ægritudo, vomitus, &c. immanius affligunt; qui bus signis medico sagaci, etiam ante eruptio nem, confluentes se produnt *. In these circumstances, we need not be under the least apprehension of any bad consequences from early purging; a fulness and distension of the whole vascular system, accompanied with ardent fever, point out the necessity of evacuation, without which, it is with difficulty an eruption of the pimples can be induced; accordingly we find, that a plentiful bleeding forwards the eruption. It is much the same in respect to purging; whatever contributes to lessen the quantity of these contagious humours, with which the vessels are overloaded, must promote the eruption: I do not mean that early purging should supersede the necessity of bleeding, as each of these evacuations answer their own purpose: And it will be found, the intestinal discharge, in most bad cases of small-pox, can be more easily induced, and will prove
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* Sydenham. Op. pag. 135.

more successful in the event, having been preceded by bleeding. In all cases of extensive assimilation that bear bleeding; we need be under no dread, by the purging course, of diverting the morbid fluids from the surface, as, notwithstanding all the evacuation we can make, it is not easy to prevent a numerous eruption of pimples upon the skin.

It is only in cases of moderate assimilation, or in weakly habits, where a diversion of the morbid fluids is attended with danger; for which reason I have formerly observed, that the purging course is not to be used promiscuously in every case of small-pox. It is unnecessary in the mild kind, as both the assimilation and symptoms are moderate. We are most apt to be deceived in children of irritable habits, where the symptoms are violent, and after all, the eruption extremely moderate. In such cases, evacuation of every kind, whether by bleeding or purging, must prove hurtful; a lenient clyster, as occasion requires, is sufficient. In a case of this kind, the knowledge of the patient's constitution is of the greatest use in regulating
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the treatment, and of preventing our being deceived by appearances.

Objection 4. A daily course of purging, may weaken the patient, and deprive him of strength sufficient to undergo a tedious and painful disease.

Answer. The impropriety of purging in the commencement of fevers in general, is well known to most practitioners in physic, on account of its debilitating effects ; yet I hope it will appear, from what has been already said on the theory of this disease, that purging will have a very different effect, in the commencement of the eruptive fever of small-pox. If this fever, as we have endeavoured to shew, is the effect of contagious matters accumulated in the vital fluid, irritating the nervous and arterial systems in general ; we may be assured, the sooner the irritating cause is removed, the effect will proportionally cease. This plainly appears in the mild distinct small-pox ; for no sooner is the contagious ichor deposited on the skin in pimples, than the fever perfectly subsides : Whereas in every bad kind of the

the disease, where the assimilation is extensive, and the skin incapable of containing the whole of the assimilated fluids in pustules, what of these remain in the system, serve to keep up the fever, which they invariably do, in all the different kinds of bad small-pox. This shews the utility of removing the proximate cause, which, though we cannot perfectly accomplish by the purging course, yet, by daily perseverance in it, this cause is gradually lessened, and at length subdued, by which both the fever and other symptoms are rendered moderate.

There is an observation which I am persuaded all attentive practitioners have made, in respect to purging in general, by which we understand from its immediate effects, the propriety, or impropriety of its exhibition. When a purgative has been injudiciously administered, it is attended with fatigue, and followed with increased debility. Whereas a well timed purgative, by carrying off a superfluous load from the vessels, always leaves the body lighter, exhilarates the spirits, and gives additional strength. I can give my testimony,

mony, that this effect more or less, (making allowance for the severity of the eruptive symptoms, in all bad cases of small-pox) attends the purging course from the commencement of the eruptive fever.

Objection 5. Will it be safe to pursue the purging course with infants on the breast, under an inflammatory disease?

Answer. If the proximate cause of small-pox, is the same in infants as in adults, the indications of cure must be the same. An open belly is natural to a child on the breast, and an opposite habit would be attended with many bad effects: But for the satisfaction of objectors, I shall illustrate the propriety of the practice, by an example, of which several might be given.

In the month of September 1782, I was called to an infant on the breast, of eight months old, on the fourth day of the eruption; her face, body, and limbs, were covered with confluent small-pox. Although the eruption was complete, she had a considerable degree of fever, with much restlessness, and short disturbed sleeps. Her belly

belly was slow, and inclined to be costive; she still fucked tolerably well, but was otherwise fretful and much distressed. A clyster given her in the evening operated twice, and she had a quieter night. Next morning she took three or four tea-spoonfuls of the following infusion:

R. Fol. sen.

Man. calab. utr. drachm. ii.

Pulv. crem. tart. drachm. i.

Sem. carv. semidrachm.

Superinfunde aq. bull. unc. iii.

Macera per noctem et cola, colat.

Add. syr. rosar. pall. unc. i. Misce.

Of this she took three tea-spoonfuls every morning, and direction given to increase the dose, if necessary, till it procured at least four stools in twenty-four hours.

This dose had the desired effect, and she was remarkably cooler in the evening, her sleeps were longer, and the suppuration of the pustules looked as well as could be expected, in small-pox of that kind. The purging dose was continued every morning until the 10th day, with apparent advantage, and moderation of every symptom, in so much that her mother thought her so well that she omitted her purging dose

dose that morning. She became more feverish, restless, and uneasy before noon, when I saw her, and directed the purgative to be given immediately, (now increased to four or five tea-spoonfuls). This dose operated briskly several times before night, and was afterwards continued daily until she was perfectly recovered. She had no second fever; her head and face which were considerably swelled when I saw her first, had gradually subsided with the evacuations *.

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* There was a singular circumstance in this case, which deserves to be noticed. This child caught the small-pox infection when she had been some weeks under the hooping-cough; but from the commencement of the eruptive fever, this complaint disappeared, and did not return till she was perfectly recovered of the small-pox, after which it continued but a short time, and in a moderate way; so that by the intervention of the small-pox, this tedious and severe disease, especially to an infant on the breast, was considerably shortened and mitigated. Does not the singularity of this case, afford a hint, that that dangerous and often fatal disease to infants on the breast, and other weakly children, may at least be interrupted for a time, and possibly mitigated afterwards, by communicating the small-pox? It is certain if this last infection is moderate, the young patient has the chance of acquiring more strength to undergo the hooping-cough when it returns.

The Treatment of Putrid Small-pox.

Putrid small-pox are for most part usher'd in by a fever of the inflammatory kind, and, according to the degree of the putrid diathesis existing in the system, the symptoms peculiar to this species appear in a more early, or later period of the disease.

According to the prevalence of the putrid diathesis, the symptoms of high inflammation are *cæteris paribus* the less, and the putrid appear sooner. This kind of small-pox therefore must comprehend varieties, which we shall reduce to two; the first where the disease commences with symptoms of inflammation; the second where the putrid symptoms appear from the beginning; each of these require considerable difference of treatment.

I. When putrid small-pox commence with inflammatory fever, and all the symptoms run high, and point out the necessity of bleeding, the patient cannot suffer much by this evacuation while the pulse keeps firm. For example, when the patient is in

in the flower of youth, has been addicted to high living, or hard drinking, if the common symptoms are urgent, the fever considerable, the pulse full and strong; the relaxation of the vessels by bleeding, appears to be a rational indication; and where the pulse does not sink upon bleeding, but retains its strength and firmness, there is nothing that contraindicates the exhibition of a gentle purgative the following day. The weak texture of the blood indeed, shews what kind of disease we may expect; but even in this event, as we frequently find diarrhœa accompanying small-pox of the putrid sort, without any bad effect, it may encourage us in the use of gentle purgatives, in the commencement of the disease, especially while the pulse keeps firm. If an apprehension of weakening the vital powers in this species of small-pox, where neither diarrhœa, nor any other apparent evacuation occurs, excepting what is discharged by the salivary glands, and we suspend purging altogether, or even delay it long, the *prognosis* in every case of this sort must be desperate; the great assimilation that takes place in ha-

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bits of this kind, must be dislodged by nature or by art, without which we can have no prospect of a cure. Patients indeed of this description are sooner fatigued from the necessary exertions attending diarrhoea, or the use of purgatives ; but it is to be observed, these patients are able to bear a cordial with advantage, when those in other kinds of small-pox are evidently hurt by it. A practical example will illustrate this doctrine better than any reasoning upon the subject.

In the month of October 1776, a young gentleman, eighteen years of age, of a swarthy complexion and full habit, (the small-pox prevailing at the time), was seized with the common symptoms, which in general were high, and indicated an extensive assimilation. The antiphlogistic course was observed, though he was not blooded on account of a peculiar timorousness, and some degree of languor, uncommon to a youth of his age, and natural vivacity, which I at first attributed to a dread of the distemper, while at the same time his pulse was about 130, and pretty round and strong. On the second day of
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the eruptive fever, he took eight ounces of the infus. tamarind. cum sen. at three different times, and at one hour's interval from each, which operated thrice freely, and did not increase the languor, but rather relieved him. The morning of the third day, the purgative was repeated, and during its operation before noon, the small-pox appeared; they were of the contiguous kind, interspersed with some conflues; at the same time his head and face began to swell. The fourth day the purgative was repeated with good effect, in the evening the pimples were very numerous, though rather of a pale colour, and many *petechiae* appeared over his breast and body. As this was the first putrid case that had come under my care, since I had adopted the new mode of cure, my courage failed in respect to the propriety of continuing the purgative, even though his pulse kept full, and without increase of languor, yet I intermitted the purgative on the fifth morning; the consequence was, an increase of fever, anxiety and restlessness, *cephalalgia* and *delirium* more violent, a greater progress in the swelling

of the head and face, and the patient in every respect worse. This unexpected alteration led me to direct a purging clyster in the evening, and to follow it with a repetition of the purgative on the morning of the sixth day, and the sensible relief he obtained from its operation, determined me to continue it, notwithstanding the number of petechiæ had increased considerably during the last 24 hours, and as the suppuration advanced, a bloody mixture appeared, in almost every other pustule. From this day his pulse gradually abated in point of frequency, and though not strong, was sufficiently firm. The swelling of the head and face, and the ptyalism kept moderate. As his stomach did not bear even a cold infusion of the bark and elixir of vitriol, he was allowed a glass of claret and water frequently; before the complete maturation of the pustules, the colour and consistence of the pus improved, the petechiæ became fainter in colour, and gradually disappeared, and towards the termination of the disease, he was purged every second day, and supported

ed with wine, along with a light, cooling, and nourishing diet.

What I would chiefly remark from this case is, that as there were early appearances of an extensive assimilation, joined with a putrid habit, had the attenuated fluids been left to take their usual course, the disease in all probability would have proved highly dangerous; but by the method adopted, the swelling of the head and face was moderated, as also the ptyalism, and there was no secondary fever.

The above case afforded me much satisfaction, as it established my mind in a point upon which I had perplexed myself by reasoning; and evinced that in some putrid cases the purging course might be carried on with good effect. It is certain much worse cases of the putrid kind occur in practice; for as this diathesis appears to subsist in different degrees in different subjects; when combined with small-pox contagion, it always produces a formidable disease, and requires very particular attention.

2. The second, and most dangerous sort of putrid small-pox, is where the disease

commences with typhus ; the symptoms commonly are, great oppression, and dejection of spirits, a quick, feeble, and fluttering pulse, all the symptoms violent, petechiæ interspersed with the pimples in the period of eruption, or even appearing some days before. The pimples numerous and smaller than usual, and as they advance, the suppuration thin, ichorous and bloody. Where this diathesis is powerful, we find the disease attended with various haemorrhages, as from the lungs, uterus, kidneys, or intestines ; the blood discharged is commonly more dark, and of a weaker consistence than good blood ; and what passes by the intestinal canal, is of a dark brown colour, inclining to black.

It will appear evident from the history of this species of small-pox, that bleeding in such circumstances, must be hurtful ; and though Sydenham views the petechiæ and bloody urine as an effect of the violent commotion of the blood, and prescribes bleeding, yet I apprehend this could only take place in the kind of putrid small-pox first described, which is attended with inflammatory symptoms.

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In this kind, the indications of cure are, to check the putrid tendency of the fluids, by supporting the *vis vitæ*; and to diminish the excess of contagious matter in the system, by promoting the diarrhoea, which commonly attends this sort of putrid small-pox, or purging gradually as the strength and other circumstances will admit, where the belly is slow, and no diarrhoea occurs. These indications co-operate reciprocally, in promoting a cure. The attenuation of the vital fluid, is most effectually checked, by supporting the *vis vitæ*, and the judicious reduction of the putrid and contagious fluids, contribute to the same end.

In this kind of small-pox, there is the greatest necessity for the constant application of fresh air to the patient, of changing both his bed and body-linen often, and keeping his apartment as clean and cool as possible*. There is a simple ex-

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* The poor, which constitute so great a proportion of the nation, not having it in their power to comply with the above directions, of consequence are deprived of the benefit of these salutary measures, which are essential in this, as well as in every bad kind of small-pox; and is one reason of the disease proving more fatal to persons of this description, than to others.

pedient that I have found of considerable use in this, and other bad kinds of small-pox ; If the chamber of the sick is large, which it always ought to be, to have two beds in it, placed in such a way, as the air may circulate freely around them. Let the patient be moved from the one he slept in through the night, into the other, where he is to continue all day ; these changes from one bed to the other, night and morning, I have found to be extremely agreeable and refreshing, and are attended with obvious advantages. It is also of considerable use, to sprinkle the bed-clothes, and the floor of the chamber frequently with vinegar.

If the sickness and vomiting are excessive, which frequently happens in the beginning of this kind, the saline draughts where the acid prevails, may be given from time to time in small quantity, or may be swallowed in a state of effervescence. These are not only grateful to the stomach, and tend to remove the irritation that is upon it, but afford a small proportion of fixed air to the system, a principle which is always deficient in habits

bits of this kind ; with the same intention a glass of water well impregnated with the aerial acid, may be given frequently.

As the pulse is commonly feeble and quick, accompanied with great oppression, a draught of white wine-whey from time to time, claret and water, or plain claret, may be given from the beginning, and through the course of the disease. Suffer the taste of the patient to direct the wine that is most agreeable to him ; and when his stomach is able to bear a draught of any liquid without rejecting it, let it be acidulated with the juice of Seville oranges or lemons, apple-tea, butter-milk, or cold water. If he is disposed to eat a mouthful of any thing, it ought to be of a light, cooling, and acidulous nature, a ripe orange, an apple, stewed prunes, or fermented flummery, called with us sowens ; these, and such as are of the same nature, will afford a proper cooling nourishment, and have a tendency to dispose the bowels into a lax state. If an open belly is not produced by this regimen, more especially if lumbago, cephalalgia, great anxiety

anxiety and oppression continue, let an opening clyster be given him in the evening. I own, that from the irritability of certain habits, and the urgency of all the symptoms, I have been obliged, after the operation of the clyster, to give a draught with *tinctura Thebaica* at bed-time ; but it was the most urgent necessity that led me to this, as it counteracted my general plan, and interrupted the diarrhoea ; its effects in a few disturbed and oppressive slumbers, produced no advantage adequate to the loss sustained by it.

A diarrhoea occurring in an early period of the disease, did more to assuage the tumult in the system at this time, than any opiate possibly could effect ; nor can I recollect any case where it increased the languor, anxiety, and oppression, that commonly attends this kind of small-pox ; the inevitable fatigue accompanying their operation, was the greatest inconvenience attending it, which rendered the frequent use of wine more necessary ; nor do I remember a case where it protracted the eruption of the pimples, which generally

rally appear some part of the second, or early on the third day.

The eruption, which in this kind is commonly universal and numerous, whether contiguous or confluent, always produces some degree of mitigation of the symptoms; if the irritation of the stomach is quieted, the patient will be able to receive a cup of thin panada, sago and wine, &c. which it will be necessary to give from time to time, and is a more substantial support than even plain wine *.

Whether petechiæ appear before the eruptive fever, during the course of it, or show themselves with the eruption of the pimples, the treatment above described, so far as I have experienced, is the best calculated

* In mentioning this kind of light nourishment, I do not mean that it should supersede the use of plain wine, and wine and water occasionally. In the case of adults especially, labouring under a disease attended with so much debility and oppression, when either a natural diarrhoea takes place, or where it is wanting and necessary to be promoted by gentle evacuation, the frequent use of wine, is not to be neglected; the quantity can only be determined by the urgency of circumstances; to children, I commonly direct wine and water, or white wine-whey.

culated to counteract their spreading, and to alleviate all the pressing symptoms attending this early period of the disease. If the petechiæ continue to increase every day with the eruption, the sooner the patient is able to bear some light preparation of the bark, the better.

The late ingenious Dr Alexander Monro, was the first person in this country who exhibited the bark in small-pox. He took the hint from observing its singular efficacy in bringing on a laudable suppuration in cases of gangrene ; this led him to try it in a variety of ulcers, where the discharge was ichorous, and finding the good effects of it in these cases, he applied it in the small-pox, ‘ where (says he) either a right suppuration did not come into the pustules, or petechiæ shewed a disposition to a gangrene ; and I had the pleasure to see the effects I expected from it, in several variolous patients to whom I gave the bark ; the empty vesicles filled with matter, watery fancies changed into white thick pus, petechiæ became gradually more pale coloured, and at last disappeared ; the blackening

‘ of

' of the pox, began sooner than was expected *.' For adults, he gave the fine powder, from ten to forty grains, every four or five hours, in any proper vehicle: To children, from half a drachm to two drachms, mixed with a small quantity of warm milk, in the form of clyster, twice a-day, having first (as he expresses it) unloaded the great guts with a laxative clyster.

The good effects of the bark, especially when joined with the vitriolic acid, in small-pox of the putrid kind, are often so obvious, that both the petechiæ disappear, and the condition of the suppuration in the pustules, is meliorated in a very short time.

I have seldom found the patient's stomach, in this kind of small-pox, able to bear the bark in substance, especially in an early period of the disease; I have, therefore, been in the practice of giving it in a cold infusion, and rendered more grateful to the stomach, by the addition of a little cinnamon, to which I add a

small

* Medical Essays, Vol. V. p. 87, 88.

small proportion of *elixir vitrioli*. The way I commonly exhibit it, is as follows:

Rx. Puly. cort. Peru. rub. unc. i. ff. *.
Cinnam.

Gum. Arab. utr. dr. ii.

Tere simul probe in mortar. marin. cum
sp. vin. gall. unc. iii. per semi horam, pau-
latim add.

Aq. font. lb. ii.

Macera per noctem in vase idoneo,
et colat. add.

Elix. vitriol. gtt. lx. Misce.

A table-spoonful or two of this, may be
given every four hours, and the dose in-
creased as the stomach will bear it.

If the stomach is weak or irritable, it is
best to begin with a small quantity, and
increase the dose from time to time; and
if

* For cold infusion, I have always preferred the red Peruvian bark to the *pale*; it keeps better, which shews it is stronger; but I prefer the pale bark when given in substance, as it fits much easier on the stomach. The Gum Arabic is added with intention of suspending the resinous part of the bark, which otherwise would fall to the bottom.

if the urgency of the symptoms demand it, change it for the fine powder, or add a dose of the powder to every dose of the infusion.

In giving the bark in substance in putrid cases, I try it in various ways, sometimes in a glass of port or claret; sometimes in pure water, adding a little of the juice of fresh lemons, or Seville oranges, which makes it fit easy on the stomach; for the same purpose, I have given it to children in a little butter-milk. One child on the breast, under a numerous crop of confluent small-pox, with putrid appearances, drank a strong infusion of the bark, with a mixture of the fine powder, with greater avidity than it received the breast.

One singular advantage of the bark in this kind of small-pox is, that it seldom checks the diarrhoea, but rather promotes it, especially at first; and when it loses this effect, we must have recourse to a gentle purgative, and give the bark at proper intervals.

Where hæmorrhages occur, the same method of treatment is to be observed, *viz.* the cooling regimen, fresh air, different preparations

preparations of the bark, and what Sydenham so justly extols, and found so useful in his practice in these cases, *viz.* the patient's ordinary drink being acidulated with the spirit of vitriol.

It is by persevering in the practice of the above directions and remedies, that we shall most effectually support the vis vitæ, and of consequence check the putrid tendency in the habit, which will soon appear, by a change in the condition of what is contained in the pustules, whether of an ichorous or bloody nature; as also by an alteration in the number and colour of the petechiæ, as well as in restraining the hæmorrhages. It is often surprising in a complicated disease of this kind, attended with so many threatening appearances, to observe, in the course of a few days, the change induced upon what is contained in the pustules, and the gradual disappearance of petechiæ and maculæ.

We shall next consider how far the second general indication is applicable in this kind of small-pox, *viz.* diminishing the excess of the contagious fluids, by encouraging the diarrhœa, or judiciously promoting

noting it if tardy, and at the same time supporting the vis. vitæ.

It is necessary to the cure of this kind of small-pox, not only to check the putrid tendency in the fluids, but as the strength of the patient, and other circumstances admit, to diminish the excess of contagious matters, which, as we have formerly observed, multiply themselves greatly in habits of this kind. It must appear obvious, that while the vessels continue replete with, and oppressed under a load of contagious humours, the severity of all the symptoms will be kept up, and the most powerful strengthening antiseptic remedies cannot operate upon the system with that advantage they would otherwise do, were the vessels in general in a more relaxed state. In cases of this kind, where so great a degree of debility prevails, this relaxation of the vessels cannot be obtained by bleeding; experience teaches, that this operation has always been attended with the worst effects, and increases every putrid symptom; when variolous contagion, therefore, meets with habits of this kind, the putrid disposition is not only in-

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creased,

creased, but one of the worst kinds of small-pox is produced. In these circumstances, nature, for most part, relieves herself by a diarrhoea, and points out to us the method of relief, when that evacuation is wanting. But from what has been observed on the theory of this disease, if neither diarrhoea occurs, nor some degree of purging substituted in its place, we cannot depend on the contagious fluids being carried off by the other ordinary outlets; in which case, the patient must fall a sacrifice to the disease.

The debility and oppression that always attend this kind of small-pox, proves an additional argument with many people against a practice of this kind; for if they oppose purging in small-pox of the inflammatory sort, they hardly will be persuaded to use it, where the patient is apparently so low; but we ought to consider, that this oppression and lowness, arises from the vessels being overloaded with an excess of the putrid contagious fluids, which if not gradually evacuated, either by nature or art, we cannot have the least prospect of the patient's recovery.

It

It may appear improper, if not a contradiction, to purge a patient who requires the aid of wine and other cordials to support him; and it certainly would be so, if the purging proposed, served to increase debility; but in place of this, we find, when an early diarrhoea accompanies this kind of small-pox, the partial relief obtained by these evacuations, manifest the propriety of this work of nature, which is still rendered more consistent, by attending to the dark colour and *fætor* of the stools, which shew they contain a portion of the morbid humours. Were we to attempt to counteract nature in this operation, we certainly should augment every symptom. Sydenham, who could not be accused of rashness in purging his patients, admits the necessity and usefulness of diarrhoea in the confluent small-pox of children: ‘Sunt vero et alia symptoma duo, quæ variolis confluentibus accidunt, haud minoris momenti, quam vel pustulæ ipsæ; vel tumor, vel aliud quodlibet e predictis; salivatio nempe in adultis, atque in infantibus diarrhoea.— Utrum providens natura has evacuatio-

' nes idcirco substituerit, quod in pusillo
 ' hoc, ac humili, genere materia morbi-
 ' fica ita penitus nequeat exterminari, ac
 ' in pustulis istis majoribus ac magis fa-
 ' stigiatis generis discreti, nullus definio,
 ' cum historiam tantum scribam, non sol-
 ' vain problemata. Hoc certo scio, quod
 ' non solum variolas confluentes plerum-
 ' que comitantur, sed etiam quod quæ per
 ' illas fit evacuatio, tam est necessaria,
 ' quam sunt vel pustulæ, vel faciei et ma-
 ' nuum intumescentia *.' There is in-
 deed a difference in the nature of the fe-
 ver usually accompanying confluent small-
 pox, and the kind we are treating of; but
 if the diarrhoea in this last sort, instead of
 weakening or exhausting the patient, pro-
 duces some degree of lightness and relief,
 it is no more proper to check it, than it
 would be to check the diarrhoea attending
 the confluent small-pox in children. This
 evacuation answers the same end in both
 kinds, *viz.* in carrying off a portion of the
 contagious fluids.

The

* Sydenham, Op. p. 137, 138. See also another quotation from Dr Sydenham to the same purpose, p. 201.

The learned and ingenious Dr Freind, in his seventh commentary on fevers, entitled, *De purgatione: quam vim habeat in febre putrida, quæ variolis confluentibus supervenit, &c.* is at much pains to convince his brethren and the world, of the usefulness of this practice. He establishes the propriety of it, upon solid argument, and the best authorities; and adduces two cases, the one unsuccessful, where his opinion was over-ruled by the other physicians in consultation with him, notwithstanding that every attempt made to purge the patient, was attended with the best effects. I shall transcribe one instance of this, with a view to shew in what perilous circumstances his noble patient was reduced, upon the seventeenth day of the disease. Feb. 17. ‘ Mane cum febre et convulsionibus gravius luctabatur, evasit que plane veternosus: a triduo nullum opiatum sumferat. Itaque rursus, ut purgaretur institi. Sed eodem ac prius modo occursum est. Novum argumentum ex hoc comatis accessu natum est, periculum scilicet esse, ne si duceretur alvus, nimio æger fluxu interiret: hujus modi

‘ enim fluxum in *comate*, inter notas maxi-
‘ me lethales haberi. Qua quidem argu-
‘ mentandi via minus mihi satisfactum esse
‘ fateor, quod ipsum hoc *coma* nihil aliud
‘ esset, quam alterius morbi nota: quod si
‘ morbus fuisset primarius, ne tum quidem
‘ recte interdicendum esset purgantibus:
‘ quæ ab omnibus medicis in usum duci
‘ video, cum in *comate* alvus parum li-
‘ quida extiterit. Quid quod in *comate*
‘ tantum absit, ut illa ventris resolutio sem-
‘ per cum periculo fiat, ut aliquando sua
‘ sponte aborta morbum summoverit. Sed
‘ fidere *cephalicis* commodissimum visum
‘ est: ad quem finem *julapium* est ordina-
‘ tum. Post meridiem febris ita invales-
‘ cebat, ut in easdem æger angustias de-
‘ ductus esset, quibus *sexta* abhinc die con-
‘ flictabatur. Itaque de eo, ut hac ipsa
‘ nocte morituro, præsagium factum est;
‘ cognatique, tanquam extremo munere
‘ functi discesserunt. In hoc rerum discri-
‘ mine, an medecina posset quicquam pro-
‘ ficere, valde dubitatum est: certe si qua
‘ subesset salutis spes, in eo maxime posita
‘ esse videbatur, ut flueret alvus. Hoc ut
‘ efficeretur, dice a me flagitatum est:
‘ quod

‘ quod si fuisset effectum, viribus nondum
‘ attritis poterat prodeesse. In summo ta-
‘ men periculo præstaret anceps experiri
‘ remedium, quam nullum. Pronuncia-
‘ tum est esse moriturum, sive purgaretur
‘ sive non: purgari tamen nullatenus con-
‘ cessum: id enim esse affirmabant, ut ex-
‘ tra artis regulas positum, ita rationibus
‘ suis incongruum. Ad extremum vero
‘ ita convenit; ut hora nona hoc sumeretur
‘ catharticum:

‘ Rx. Decoct. sen. Gereon. unc. iv.

‘ Sal mirab. Glauber, unc. i.

‘ Aq. Cinnamom. hord. dr. vi. M.

‘ Trium fere horarum spatio, alvus ingenti
‘ copia bis descendit: dejectionesque hac
‘ cum solidæ et nigræ, tuin admodum fœ-
‘ tidæ fuerunt. Dominus Buffiere, qui una
‘ aderat, testis est, quem admodum con-
‘ vulsiones illico remiserunt. Febris plu-
‘ rimum inclinata, pulsusque valentior fac-
‘ tus. Coma, quo graviter laboraverat æ-
‘ grotus, evanuit: post aliquot horas, non
‘ ea quidem qua prius vehemtia, recurret*.

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The

* Jo. Freind. Comment. novem de Febribus, pag. 155,
 156, 157.

The symptoms here related, point out as great a degree of debility, as can take place in this, or any other period of the disease ; and the cathartic produced for a time, the best effects ; the convulsions remitted, the fever abated, the pulse rose, and the coma was removed ; yet such was the power of prejudice, that the happy effects of the purgative were overlooked, and the patient tortured with repeated vesicatorys, juleps, et sp. cranii humani, &c. till on the 24th day, he was delivered by death.

Dr Freind's second case, had a more agreeable and fortunate issue, he was then at liberty to follow his own judgment. The second fever took place the 12th day from the commencement of the eruption. The heat of the patient was great, with a quick and depressed pulse, subsultus tendinum, delirium, difficulty of breathing, and without rest in the night. In these circumstances, the Doctor reasons concerning Sydenham's practice of bleeding in such cases, but very wisely judges, that purging was less apt to diminish the patient's strength than bleeding. He, therefore,

fore, on the 13th day, directed extract.
rudii gr. xvi. soluta in aq. pæon. c. which
procured four stools, and raised his pulse ;
but as the delirium and convulsions con-
tinued, vesicatories were applied to his
arms, and the quieting draught repeated,
which he had been in use to take at bed-
time. On the 14th, in the morning, symp-
toms continued as before, notwithstanding
of a plentiful discharge from the blisters :
At 10 o'clock, he took elect. lenetiv. unc.
ff. soluta in aq. lact. which procured two
stools ; but in the night, he had six more.
On the 15th day, in the morning, his pulse
was much firmer and better ; his head re-
lieved, though not perfectly ; in the night,
he had eight stools. 16th day, His pulse
almost natural, and every symptom better ;
this day, he had four stools. I shall con-
clude this history in the Doctor's own
words : ' Jan. 22d. (or 27th of the disease)
' Febris, cum reliquo malorum agmine,
' decessit. Æger quotidie vires sibi instau-
' rari sensit, quanquam per tres hinc secu-
' tos dies alvus sæpius descenderit, tandem-
' que integre convaluit. Id in hac histo-
' ria maxime notari debet, quod quatridui
 ' spatio,

‘ spatio, dum et febris plurimum s̄eviret,
 ‘ et vires vehementer essent afflictæ, alvum
 ‘ fere *tricico* dejecerat ; unde tamen nun-
 ‘ quam ne quidem languescere sibi visus
 ‘ est *.’

These examples shew the signal efficacy which attended purging in the putrid fever that follows confluent small-pox ; but it would appear, that excepting Dr Mead, and a very few physicians besides, this method was opposed by the generality of practitioners ; and it appears to have been but little attended to since that period : If Sydenham continues to be the standard of practice, it will not only be overlooked, but opposed. The inference I would draw from the above histories is, If purging is attended with so many salutary effects in the putrid fever following confluent small-pox, where symptoms even of much greater debility occur, such as the quick, low, and depressed pulse, delirium, tremors, convulsions, and subsultus tendinum, than what accompany putrid and other bad kinds of small-pox at their commencement, why

* Jo. Freind. Comment. pag. 169, 170, 171.

why should we not at this period, avail ourselves of this efficacious remedy? In the putrid fever which follows confluent small-pox, the strength is almost exhausted by the preceding fever, and universal cutaneous inflammation; yet the pulse, however low and depressed, is always raised by the judicious use of purgatives; and if they are of such essential advantage at this time, they must be much more so in the beginning of the disease, before the strength of the patient is so much exhausted. The utility of this practice, is confirmed by the salutary effects of an early diarrhœa; and we often find where this is wanting, it is frequently induced by a few doses of the cooling laxative, as happened in Dr Freind's second case, and has often occurred in my own practice. We cannot fail to observe here, that the success attending this method, is a strong testimony for the truth of the theory of this disease, advanced in the preceding pages of this work.

We must acknowledge it requires discernment and judgment to regulate the purgative in this kind of small-pox, the irritation of the stomach, and severe fits of vomiting;

vomiting, prevent the administration of it before the third or fourth day of the disease; in this case, opening clysters must supply its place; which may be given at any time when the patient is most uneasy, once a-day, or oftener, if circumstances admit, especially if we find they give sensible relief.

If no diarrhoea occurs before the fourth day, by attention to the light, cooling, antiseptic regimen formerly directed, the stomach will probably be able to bear the cathartic infusion in small quantity from time to time on the fifth day; if the state of the stomach admits of its being given sooner, so much the better; the purgative being rendered as agreeable as possible in its composition, will make it better received, and fit easier; and that the patient may not be deprived of his wine at this time, I have frequently added a spoonful of sherry or Malaga, to every dose of the laxative, and sometimes a little brandy. It is necessary, according to different tastes and habits, to change the purgative; I have made most frequent use of the infus. tamarind. cum senn. as it is easily taken, and

and can be rendered agreeable to the palate; but at different times I have used the following electuary with good effect.

R. Pulv. jalap. gr. xv.

Cryſt. tart. drachm. ii.

Ter. ſimul et fiat Elect.

cum fyr. caryoph.

A tea-spoonful of this to be given every hour, or half hour, according to circumstances, it commonly acts in a very gentle and eaſy manner.

We formerly obſerved the great utility of the bark in putrid small-pox, as soon as the ſtomach is able to receive it.

The uſe of this excellent medicine giuen in ſmall quantity, and frequently re-peated, with the addition of elixir vitriol. has often a tendency to bring on the diarrhoea; and has also this good effect, that when the diarrhoea is preſent, it is not checked by the frequent uſe of it, but rather promoted.

The quantity of wine given in this kind of ſmall-pox, muſt be proportioned to the age, habit, and ſymptoms of the patient: It may be conſidered as a general rule, that when it neither quickens the pulse, nor

nor increases delirium, it may be given not only with safety, but advantage. There is something very singular and deceitful in the common typhus, in which the patient, in the most violent delirium, tossing about his arms, speaking loud, and shewing every symptom of the greatest vigour, with a galloping hard pulse, shall be instantly composed, and his pulse at the same time brought down, upon getting him to swallow a draught of wine*. When

therefore

* I lately attended a young gentleman 26 years of age under a typhus; he was remarkably sober and temperate, but from a long stomach complaint, had for several years been prevented from using vegetables, or wine; his ordinary diet was a bit of solid meat, and a glass of rum, or brandy and water. Pulse 120, tongue much furred, and the delirium constant and obstinate; from the second day of the fever, he was frequently so high and unmanageable, that two stout men were found necessary to keep him in bed. I tried him with strong port wine, but it was not agreeable to his taste; and was therefore obliged to form his cordial of brandy and water, which he used pretty liberally. It was remarkable, when either through obstinacy or neglect, he had been too long of getting support, he turned extremely high, at which time his pulse was more depressed, and increased in frequency: Often upon my visiting him at such

therefore small-pox is complicated with a fever of this kind, it always produces a dangerous disease, requiring as much light support as the patient can receive; and wine to be given frequently, not only when he is in a low and depressed state, but when high and the delirium fierce. And as in this case, the retention of putrid fauces in the bowels, must always

such times, and giving him a glass of brandy and water, and sometimes a sugar biscuit crumbled into it, he immediately after fell quiet, spoke softly, and got a little rest, and what was remarkable, his pulse became rounder and less frequent. He took a draught with the vitriolic æther and tinct. Thebaica, every six hours, which greatly quieted him, and composed an almost constant tremor upon his arms. He was allowed every day a basin of strong chicken-broth and bread, with panada and brandy at times, besides brandy and water, and for most part he drank a bottle or 3 pints of coniac, in 24 hours. He was always relieved by emptying his bowels once in two days by a clyster, and his principal relief at last was by three or four copious loose stools. By this method within three weeks, the fever gradually abated, after which he enjoyed better health than he had done for several years, and was able to eat vegetables, and drink a glass of wine; he disrelished the brandy as soon as the fever left him.

ways prove a fomes to the disease, we have a double inducement to promote the intestinal discharge.

I shall conclude this part of my work, with a case which afforded me much satisfaction, as it terminated favourably after many threatening appearances.

A young man, 22 years of age, in the latter part of autumn, of a full gross habit and fallow complexion, was seized with fever of a low kind, attended with severe retchings to vomit, violent pains in his head and back, and frequent alternations of cold, and burning heat. As it was towards evening when I saw him, nothing more was done, than to empty his stomach with a few basons of tepid water, which brought up a quantity of bilious and viscid humours.

He passed a restless night, with delirium and very high at times, a feeble and quick pulse, which I could not reckon distinctly, frequent retchings to vomit upon raising his head from the pillow, with severe pain of his head and back. He was ordered the julap. salin. which he took in very small quantities, as his stomach could bear it; this

this he sometimes retained, and at other times threw up.

This evening, having had no stool during the three preceding days, and labouring under much anxiety and oppression, with violent lumbago, a laxative clyster was given him, which procured a copious and very foetid stool, after which he was allowed now and then a spoonful or two of port and water.

After an extremely restless night, and constant delirium, tremors in his arms, and subsultus tendinum, early in the morning a small thick eruption of pimples appeared on his face, and many on his breast, interspersed with petechiæ. The vomiting still continued at times; pulse about 140. A fulness appeared on his face, his eyes watery, inflamed, and yellowish, his tongue foul, and urine limpid. He was incapable of receiving any kind of support, but a spoonful of port and water from time to time, or a little lemonade.

A considerable increase of pimples and petechiæ this evening extending over his body and extremities. The clyster was repeated, which had a good effect; a little

plain wine was given him by spoonfuls in the night, which procured a few short sleepes.

The second day of the eruption. Pulse somewhat abated in frequency, though still feeble. Increased swelling of the head and face; delirium constant; lum-bago somewhat moderated.

R. Infus. tamarind. cum fen. unc. iv.

Sal Glaub. drach. ii.

Sach. rub. drach. vi.

Sp. vin. gall. unc. i. Misce.

A third part of this was taken every hour, and direction given to support him with a cup of white wine-whey, during the operation of the physic.

The laxative operated thrice, without creating the least symptom of debility; he was more distinct at times; and had drank about a pint of white wine-whey, which contained above a gill of wine; the swelling of his head and face considerable, with ptyalism. This afternoon he was able to receive a few spoonfuls of thin panada and wine. The eruption of pimples very thick upon his face and body, mostly of the contiguous sort, and intermixed with

with some confluxes ; the petechiæ numerous ; his breath foetid, and his urine dusky, and depositing a dark sediment.

R. Infus. cort. Peru. lb. i.

Tinct. — — unc. i. fl.

Elix. vitriol. gutt. xl. Misce.

Of this he took two table-spoonful every four hours through the night, and two spoonful of port wine from time to time.

Third day. A restless night, with intervals of short slumbers. His pulse and other symptoms much as yesterday morning. The pimples and petechiæ numerous. An evident mixture of blood in his urine.

The cathartic was repeated, and after its operation, the infusion was directed to be given, and his wine as before.

By the operation of the purgative, he had voided two very foetid and blackish stools before dinner ; he had taken only two doses of the bark since that ; but as it sat easy on his stomach, half a drachm of the fine powder, moistened with a tea-spoonful of brandy, and mixed with two table-spoonfuls of the infusion, was direct-

ed to be given every three hours through the night.

Fourth day. The swelling of the head and face not increased since yesterday; the ptyalism moderate. Pulse 96. Many of the pimples ichorous and bloody, others crude and pale-coloured. His sleeps were rather longer this night, and he was more distinct. The putrid symptoms still prevailing, I directed them to persevere in the bark this day, and increase the dose of the infusion to three table-spoonfuls, with half a drachm of the fine powder, every two hours, and a glass of port wine at intervals: Apples stewed for his dinner, and in the evening a laxative clyster.

He has taken five doses of the bark this day, and the clyster procured a large stool, still foetid and dark in colour: The bark was directed to be continued through the night, every two hours, when awake.

Fifth day. He has been high and delirious at times in the night, with intervals of short sleeps. Pulse 104, at present tolerably distinct, and the symptoms moderate.

R. Infus. tam. cum fen. unc. vi.

Sal Glaub. drachm. iii.

Sach. rub. drachm. vii.

Sp. vin. gall. unc. i. ff. Misce.

One third part of this was given every hour; the wine-whey, and plain wine continued; and directed to return to the use of the bark, when the operation of the physic was over.

The infusion purged him briskly four times; he was remarkably quiet and sedate this evening, and called for something to eat, was allowed a basin of sowens, with white wine, water, and a little sugar: the bark was continued every two or three hours when awake, and port wine either plain, or with water, when he required it.

Sixth day. Upon the whole, a tolerable easy night, with two loose stools; he took four doses of the bark in the night. Pulse 96, swelling of the head and face moderate.

R. Tartar. sol. unc. ff.

Aq. tepid. unc. iv. f. fol.

This was mixed with a quart of fresh whey, of which he took a cup milk warm from time to time, for his ordinary drink;

the bark continued as before, every four hours. Sago and wine for dinner.

This day he has had three copious stools, still fœtid and dark in colour. His bark was continued through the night; and his wine directed to be warmed, by adding a little boiling water to it, if the purging was frequent.

Seventh day. Three stools in the night, and pretty tolerable rest. Pulse 90. Petechiæ more faint in the colour; the suppuration of the pustules looks better, but still mixed; urine free from mixture. The bark was continued, and the whey as above directed, for his ordinary drink:

Four stools this day, symptoms all moderate. His bark and wine continued through the night.

Eighth day. Stupid at different times for the space of an hour. Three stools during the night; the petechiæ disappearing, suppuration looks better, pulse somewhat under 90, and rounder. The swelling a little more abated; the spitting free and moderate. His bark and wine continued, and plain whey for his ordinary drink.

Little

Little or no increase of fever this evening; pulse 94. Three stools during the day. The pustules full, and suppuration improved. His bark and wine continued, with lemonade pretty acid, for his drink.

Ninth day. Three stools in the night; he did not sleep so much as in the preceding night, but without increase of fever. Pulse 94. The swelling much down; the ptyalism diminished, though still free. His wine continued, and bark every five hours. Lemonade as before.

Three stools this day. Pulse 94. The bark continued, wine and lemonade as last night.

Tenth day. Three stools in the night, got some quiet rest. Pulse rather under 90. The swelling greatly abated, he opened his eyes a little. His chamber being very ill scented, a more free circulation of air was made. His lemonade continued, and the bark given once in six hours; a little chicken-broth with parsley for dinner.

Two stools this day. Pulse 84. So much stronger as to be propped up for a short time in bed. The pustules on his face

crusted over ; those on his body much relaxed. The petechiæ quite gone.

From this time his pulse came gradually down, and his hours of solid rest increased every night ; his bark was continued for some time twice a-day, the diarrhœa gradually abated. He drank near a bottle of port in 24 hours, got a good appetite, and had a perfect recovery.

The natural purging in this case gave me much satisfaction, as it enabled me to give the bark more freely, and superseded the necessity of purgatives. I considered the continuance of the diarrhœa to be the sole cause of preventing any second fever, which otherwise, in a case of this kind, would have been unavoidable, and probably fatal.

I likewise considered, that by the above method of treatment, a disease of this nature was shortened, as many putrid cases, when treated in another way, frequently prove tedious, if the patient survives the eleventh or twelfth day.

While the diarrhœa continues, or the purging course adopted when it is wanting, I have frequently found the satyrion (salep)

(salep) of considerable use in weak and irritable bowels : This root prepared in the way of a thin jelly, sweetened, and mixed with a proportion of wine, nutmeg or cinnamon ; a cup of this taken from time to time, was agreeable, nourishing, and from its mucilaginous nature, well suited to defend the bowels from the acrimony of these morbid humours.

I shall only add, that the cure of this kind of small-pox, is greatly promoted by a change of air ; as soon therefore as the patient's strength will permit him to be transported into the country, it will be found of the greatest use in completing the recovery of his health.

The Treatment of Crystalline Small-pox.

WE proceed to the treatment of *crystal-line* small-pox, and from a review of the history, p. 154, et seq. though they seem to originate from a predisposition somewhat similar to that which produced the variolæ putridæ, and partake of many symptoms peculiar to that kind, yet they require

require some little variation of management, which we shall now consider.

From the peculiar symptoms that chiefly characterise this kind of small-pox, *viz.* the pellucid fluid which occupies the pustules, we might be ready to adopt Sydenham's language, that the morbific matter was not duly concocted; but we find the eruption of the third and fourth day, of the same nature with that of the first; and the commencement of the eruptive fever, and other symptoms, shew it is fit for expulsion, and could not be longer retained in the system of circulating fluids; this peculiar appearance, therefore, must originate from the nature of the predisposition, which we cannot properly judge of.

As the putrid, so the crystalline small-pox, is generally ushered in by an inflammatory fever, though frequently by one of a low kind; a difference so material in the fever of eruption, will lead every attentive practitioner to a different mode of treatment. As local situation has a powerful influence upon the predisposition to generate certain kinds of small-pox, the knowledge of this circumstance is of much

much importance in directing our treatment in the commencement of the disease.

The crystalline small-pox was endemic in the city of Cork for a number of years, as observed under the history of this species, until many of the sources of a predisposition to that kind were removed. In the beginning of Dr Roger's practice in that city, he followed Sydenham in the cool regimen; but when, by experience, he came to understand the genius of the small-pox, which constantly prevailed there, *viz.* that whether *distinct*, *coherent*, or *confluent*, they were always of the *crystalline*, or, as he calls them, the *lymphatic* kind; his want of success, and various disappointments in pursuing the cool regimen, obliged him to relinquish Sydenham's plan, and to employ a different method of cure, which was attended with the best effects; but even Dr Roger's successful practice, after he hit upon the proper method of treatment, cannot be a complete rule to any, unless where crystalline small-pox are the prevailing kind that occur in any particular place, by which our treatment

ment of them may be regulated from the commencement of the disease ; as crystalline small-pox, however, is seldom or never epidemic in any part of Britain that I have heard of, we can employ no particular method of treating them, till they discover themselves.

When inflammatory fever appears in the commencement of the disease, we are obliged to follow the antiphlogistic course, as the most eligible ; in which case, if the fever and other symptoms run high, we are necessitated to bleed *. But for the most part the severity of the symptoms, or some peculiarity in their appearance, point out a malignant disease : When the pulse therefore is not remarkably hard, full, and frequent, or where uncommon languor and oppression occur, notwithstanding the fever, it is the safest course to omit bleeding ; other parts of the antiphlogistic

* In a case of this kind, when blood was taken away at the commencement of the eruptive fever, the serum was higher in colour than ordinary ; the crassamentum much corrugated on the top, with a greenish buffy coat.

gistic course may be carried on, *viz.* cool air, subacid drinks, keeping the belly open by laxative clysters, and, when the stomach will bear it, a cooling purgative.

In this kind of small-pox, however, the inflammatory symptoms, though apparently violent for a few days, have frequently a perfect remission, with the complete eruption of pimples, when the pulse becomes feeble and depressed with much quietude and anxiety, low delirium, and uncommon paleness of the countenance; these are certain characteristics of a malignant disease, and frequently precede small-pox of the crystalline kind.

When the fever changes from the inflammatory to the low kind, it is necessary also to change our method of treatment; and instead of pursuing the cold regimen, to adopt an opposite course, by supporting the *vis vitæ* with wine, wine and water, and white wine-whey. It is amazing what large quantities of wine, mulled sack, and white wine-whey, Doctor Rogers was in the practice of giving his patients under this kind of small-pox; some of them, and these young persons, drank a bottle, or three

three pints of strong wine in the twenty-four hours, and as much sack-whey as they pleased.

It is a favourable circumstance, when the eruption is completed previous to the commencement of the low fever ; when it happens otherwise, the above mentioned author found in experience, that the eruption was accelerated by the application of a vesicatory between the shoulders.

It must be observed, however, that the continuance of the alexipharmic regimen, can produce no other effect in removing the disease, than by supporting the powers of life ; in consequence of which, the distemper may be protracted for some weeks ; and even when through strength of constitution, the patient escapes with his life, it is often followed with many disagreeable effects. It is therefore necessary in this kind of small-pox, as well as in those we have already treated of, to attend to the diminution of the contagious fluids in the system. The violence of the eruptive symptoms indeed, for most part, prevent any kind of purgative being received by the mouth ; but, as has been observed, the
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end may partly be answered by clysters, which generally have a tendency to mitigate the symptoms; and upon the abatement of these, the physician will judge of the propriety of directing a gentle purgative.

A consideration of the state of the blood, hinted in a note at the foot of page 284, with other circumstances peculiar to crystalline small-pox, *viz.* the irregularity of the commencement of the swelling of the head and face, sometimes so late as the 6th and 7th day of the eruption, and frequently unattended with ptyalism: The constant crude pellucid colour of the pustules, and a less degree of general tumefaction, than usually takes place in other malignant kinds of small-pox; these considerations have led me to think, that the assimilation of the fluids, is not so powerful and extensive in habits of this kind, as in many others, and consequently there was less occasion for much purging; for which reason, in place of the infusum tamarind. cum sena, &c. I have substituted the following with good effect:

R. Merc. dulc. gr. iii.

Pulv. e. Jalap. comp. gr. xv. M.

The dose may be accommodated to different ages, and given at bed-time, either mixed with a little currant jelly, or made into a bolus with common syrup; the operation of it in general, may be depended upon, and seldom exceeds a single motion, or two at most; this powder I have repeated occasionally, once in two or three nights, and have had recourse to the clyster on the intermediate days. Dr Rogers, even in the last stage of this kind of small-pox, gives a testimony in favour of purging, though he seems to be restrained from the practice of it by over caution or timidity; for speaking of that evacuation in this period, he observes, ‘The theory of this practice, rests upon as probable a basis, as any in the whole extent of the medical art *.’ At other times, when the stomach would bear it, I have given two or three grains of mercurius dulc. for one or two nights, and a gentle purgative on the morning

* *Essay on Epidemic Diseases*, p. 157.

morning of the third day ; but when a numerous eruption shews the assimilation to have been considerable, it is necessary to the safe and effectual cure of the disease, to diminish the excess of contagious matters in the habit, as far as the strength and other circumstances of the patient will admit ; though I am persuaded this species of small-pox, neither does require, nor will admit such frequent and large evacuations, as some other kinds of small-pox do.

The learned Dr Mead has a sensible observation upon this species of small-pox :
‘ Cum nunquam fieri potest, ut in *crystalli-*
‘ *nis* liquor aquosus in pus abeat concre-
‘ tum ; id agere oportet, ut per illas vias
‘ in corpore expurgetur, quæ tenuium hu-
‘ morum derivationi natura sunt aptæ.
‘ Duxi jam antea magnum esse cuti cum
‘ renibus consortium. Dum igitur subti-
‘ lissima pars laticis per cutis meatis tran-
‘ sudare cogitur ; quod crassius est, per iter
‘ urinæ, medicamentis ad eam movendam
‘ idoneis, foras expelli debet. Ex his au-
‘ tem cum nullum sit *nitro* præstantius ; id
‘ eo pondere, quo stomachum non lædat,
‘ scrupuli scilicet aut drachmæ semis, in

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‘ *vino*

' *vino tenui* solutum (quod solum huic morbo convenit) ter die quaterve dare opportunum erit. Sub finem autem *cannarino* (quod Sydenhamo nostro in deliciis fuisse vides) aut alio quovis generoso et leni, viris sustentare licebit *.'

It is much to be wished, that in this malignant kind of the disease, which is commonly attended with great debility, and a low and oppressed pulse, that the excess of contagious fluids, could be diverted into this channel; I have attempted this again and again, but always found the nitre, even in small doses, to increase the nausea, and even excite vomiting; and have found the intention more effectually answered, with a proportion of the Tartar. solub. dissolved in warm water, and then mixed, with new made whey; or if the heat of the patient was considerable, with a small proportion of ice dissolved in cold spring water; in the use of which excellent remedy, it is necessary to caution the patient, not to indulge with too great a draught, but rather at first to sip it in a gradual

* *De Variolis et Morbillis Liber*, pag. 41, 42.

gradual way, until the stomach is somewhat habituated to it.

A chief indication in the treatment of crystalline small-pox, is meliorating the pellucid ichor contained in the pustules. It is observable, that this ichor retains its crude and pale appearance longer, in proportion to the weak and low state of the pulse, and other symptoms of debility; and that a change is seldom effected in the colour of that fluid, till we are able by proper cordials to raise the pulse. Rhazes, in order to the maturation of this kind of small-pox, recommends the vapour of warm water; his words are; ‘ Matura-
‘ tio itaque variolarum, si quidem sint fa-
‘ nibles, fieri debet per earum fomenta-
‘ tionem vapore aquæ callidæ. In aqua
‘ autem excoquuntur chamæmelum, violæ,
‘ melilotus, et althea, item furfur fru-
‘ menti, vel separata, vel simul collecta in
‘ duabus pelvibus; siti supra præscripsimus
‘ ubi de exitu variolarum faciliore redden-
‘ do mentionem fecimus *.’

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* Rhazis de Variol. et Morbill. Comment. cap. Octavum.

The same author entertains little hopes of the cure of this species of small-pox, especially where the warty pustules are numerous; but if the cure depended upon the application of the warm vapour, the low state of the patient, the oppression and urgency of all the symptoms, render its application impracticable, in the way he directs it, (see page 91.). In these circumstances therefore, if any benefit is to be expected from the warm vapour, it must be accomplished by fomenting different parts of the body and extremities with flannel cloths dipped in tepid water, and wrung well out. Dr Rogers, with a view to promote the maturation of the crude pustules, strongly recommends this practice. ‘ If the imperfect blossoms (says he) ‘ do not kindly ripen into fruit according ‘ to our wishes, I know nothing that pro- ‘ mises to promote our intentions on this ‘ head further, than constant and repeated ‘ fomentations of warm milk, or other e- ‘ mollient decoction applied to the several ‘ parts of the body, as well as the face; ‘ by this genial, but artificial warmth, the ‘ morbid particles are more forcibly in- ‘ vited

' vited to the external parts of the body,
' and sooner ripened into a justly suppu-
' rated matter in the watery and crude
' pustules *.' After all, my chief depen-
dence in meliorating the ichor in the pu-
stules, is in supporting the *vis vitæ* by wine
and proper cordials, and by admitting as
much fresh air into the patient's chamber
as he can bear.

The same intention of meliorating the
crude ichor, is also promoted by the use
of the bark. The late ingenious Dr Alex-
ander Monro, quoted page 252. observes,
That by the use of the bark in different
kinds of bad small-pox, ' empty vesicles
' were filled with matter ; watery sanies
' changed into white thick pus ; petechiæ
' became gradually more pale coloured,
' and at last disappeared,' &c. In this
kind of small-pox, therefore, we have e-
~~very~~ inducement to use the bark freely,
not only with a view to accelerate the ma-
turation of the crude pustules ; but as the
crystalline small-pox are generally accom-
panied with petechiæ, maculæ, and vibices,

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* Essay on Epidemical Diseases, p. 153, 154.

the bark, as formerly directed in putrid small-pox, and plain wine, wine negas, or white wine-whey, ought to be given in such proportion as the exigencies of the case require.

If, in pursuing the above plan of treatment, we are so fortunate as to bring about a melioration of the ichor in the pustules, when from the pellucid it becomes like whey, and gradually assumes a whiter colour and consistence, in these circumstances the prognosis is favourable; and if by means of the calomel occasionally given, and the clysters above directed, one stool is daily procured, we shall in general find the second fever moderate.

As a change in the condition of the ichor, generally follows the rising of the pulse, in cases of a numerous eruption, whether of the distinct, contiguous, or confluent kind of crystalline small-pox; if these favourable appearances occur before the commencement of the second fever, they point out a change in the habit, which admits of moderate purging, and this may be done with more advantage, than in an early period of the disease, and is highly necessary

necessary at this time, with a view to moderate the second fever.

When from the obstinacy of cephalalgia, delirium, &c. we have reason to suspect inflammation of the meninges, the case demands early and particular attention. It is certain, that in several bad kinds of small-pox, both headach and delirium are frequently obstinate, especially where no regard has been paid to the state of the bowels during the course of the disease, both which symptoms are relieved by timely evacuations. But where inflammation of the meninges takes place, which it frequently does in crystalline small-pox, it discovers itself by the following symptoms. The vessels of the conjunctiva become turgid and inflamed; the eyes are unable to bear the smallest light, and the pulsation of the carotid arteries, is much stronger in proportion than that of the wrist. The occurrence of these symptoms, ought to be attended to early. Even when the pulse is oppressed, leeches may be applied to the temples with much advantage, the discharge by them is slow and gradual, and the patient's strength cannot be sensibly impaired

impaired by it, even when they bleed freely. I commonly follow the bleeding with a laxative clyster, if there has been no motion in the belly through the day; and the same evening, or some time in the night, I direct the merc. dulc. et pulv. e jalap. comp. to be given, as a brisk intestinal discharge generally relieves the head more effectually, than any thing I am acquainted with. In some cases, where the delirium was obstinate, and there was reason to suspect too great a determination of blood to the head, which is commonly the case; after the above evacuations, and even in a few cases, where I could not use the leeches, have found singular relief obtained, by a succession of flannel cloths dipped in hot water, very well wrung out, and applied to the legs, from the knees downwards, and continued for half an hour or more at a time.

From the history of crystalline small-pox, and especially from a review of the symptoms peculiar to this species of the disease, we may naturally suppose, that habits predisposed to this particular kind, might receive considerable benefit from a course

course of preparation. As such a trial can only be effected in places where crystalline small-pox are endemial, I shall conclude this part of my subject, with the history of a preparative trial which Dr Rogers made upon a family of several children.

‘ During the course of a very malignant pock of the variolous constitution, in the years 1718, 1719, 1720, and 1721, I had occasion to comply with the desires of the parents of a family, which had been visited with this distemper. The first child that was seized with it, escaped with great difficulty; the pock was of the coherent lymphatic kind, and there being four more to go through it, it was thought proper they should all be prepared (as it is called) in the best manner, in hopes of making the expected distemper more mild.

‘ This was done, by first bleeding, then vomiting, and gently and repeatedly purging with rhubarb, manna, and crem. tartar. Their diet was entirely of the vegetable kind, only a bit of white meat indulged at noon. The intermediate times

' times were taken up with the use of Æ-
' thiops mineral in proper doses, twice a-
' day, for near three weeks before any of
' them complained. The eldest of the
' four, about 14 years old, being then at-
' tacked with the usual previous symptoms,
' was again blooded and vomited (pro-
' more); and yet notwithstanding all the
' above precautions, had a coherent pock
' of the lymphatic kind, and with great
' difficulty waded through.

' In about eight days after his recovery,
' and about five weeks from their being
' under the preparatory course, the other
' three of 9, 10, and 11 years old, were
' taken ill; they were all treated in the
' same manner with the former; it is true
' the number of the pock in none of them
' were so many, but though distinct, were
' of the lymphatic kind: And to make up
' that deficiency, greater marks of malig-
' nity attended them. In all three, there
' appeared in the intervals of the pock,
' many large livid spots as big as a vetch;
' two of them were more immediately ha-
' zarded by that fatal symptom bloody
' urine.

' However,

‘ However, what was very observable,
‘ and nowise expected, the pustules run
‘ their several periods happily, as they ad-
‘ vanced daily putting on better appear-
‘ ances, so that upon the close of the ma-
‘ turating state, the pus looked yellow and
‘ well digested, contrary to the genius of
‘ the kind. By the 11th day, all danger
‘ was over, the livid spots from the 7th
‘ day, gradually putting on a more lively
‘ colour, and by the 11th, were entirely
‘ taken up into the circulating mass; and
‘ the bloody urine which appeared on the
‘ 6th day, was quite removed by the 10th.
‘ They were all three treated in the alexi-
‘ pharmac method, before recommended
‘ in this kind of pock, such as sack whey,
‘ serp. virg. blisters *, &c.

* Essay on Epidemic Diseases, p. 170, 171, 172.

C H A P. X.

Treatment of particular Symptoms.

AS hitherto I have only considered the general treatment of small-pox, I propose, in this chapter, to point out the most effectual method of relieving certain symptoms, as they occur in different kinds of the distemper, more especially those that have not been particularly treated of in the preceding sheets.

Swelling of the head, face, and fauces, I consider as one symptom, these parts being equally and gradually effected from the same cause. It is common to the contiguous, confluent, and other bad kinds of small-pox. The time of its appearance is different; in some, commencing with the eruption, and when left to nature, gradually increasing, till the head is of a monstrous size; in others, it does not appear

pear till the fourth day, and in a few, not till the seventh. It generally accompanies a numerous eruption of pimples, and indicates an extensive fermentation in the fluids.

We have shewn that different quantities of variolous contagion are generated in the system in different kinds of small-pox ; and that the severity of the eruptive symptoms depends upon the quantity generated : The sagacity of the physician lies in discerning the extent of this assimilation, and by the most effectual means, endeavouring to prevent too great a determination of these contagious fluids upon the skin, or other parts that may be attended with inconvenience or danger, by diverting them into a safer channel, which can only be done effectually in an early period of the distemper.

The advantages derived from this method of treatment, are of the greatest importance to the patient in every stage of the disease, as when the swelling of these parts is not attended to early, but allowed to increase to an immoderate size, there is

is no symptom that occurs, accompanied with more pain, trouble or danger.

My intelligent readers will perceive, that in this view of the symptom under consideration, I have relinquished the path of Sydenham, who views this swelling as *necessary* and *essential*, and in this light gives direction for promoting it, if slow or deficient, and of raising it again, if it appears to subside. This symptom, as we have frequently hinted, when left to nature, and no attempts made either to moderate the assimilation during the stage of fermentation, or in the subsequent periods, to divert the course of these contagious fluids into a safer channel, must always be attended with imminent danger; for where the assimilation has been extensive, inducing a violent fever of eruption, the circulating fluids must necessarily be impelled to these parts in such quantity, that the faucial glands are incapable of secreting the saliva, in proportion to the quantity of fluids hurried on to them, the consequence of which must be an augmentation of the swelling, and towards the eighth day,

day, either a very slow discharge, or a stoppage of the ptyalism altogether.

The promoting therefore the swelling of the head, or even leaving this symptom to the management of nature, is attended with much inconvenience and danger to the patient, as we hinted under the salivary discharge, (with which it is intimately connected); such as, increasing fever, cephalalgia, and delirium, preventing the patient from drinking so freely as is necessary, and at last, bringing on suffocation; instead therefore of promoting this swelling, it is of the greatest importance to check it betimes.

Its prevention is safely and easily attained, by observing the same directions given under the *salivary discharge*, in attending strictly to the antiphlogistic regimen, when we have the presence of inflammatory symptoms, and daily diminishing the excess of the contagious fluids, by diverting them to the bowels. I acknowledge it is not always in our power to obtain a complete determination of the morbid humours from the head into this channel, yet by pursuing the above method,

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we can greatly moderate the swelling, and salivation, and frequently obviate the second fever.

Cephalalgia.

Headach more or less accompanies every ardent fever, from the great determination of blood to the head; but in small-pox, it also originates from the influence of that contagion upon the brain; Dr Mead gives a striking example of this in one of the six convicts, who was inoculated in a way similar to the *Chinese* method, by introducing a dossil dipt in variolous matter into one of the nostrils, which immediately brought on acute pains in the head, and continued during the course of the disease.

This double source of cephalalgia, points out the necessity of attending to the leading indications of cure proposed, p. 167. viz. moderating the inflammatory fever, and diminishing the excess of the contagious fluids; accordingly in full habits we find this symptom alleviated by blood-letting, and sometimes by a spontaneous hæmorrhage

hæmorrhage from the nose ; where no diarrœa occurs, by opening the belly, as before directed. The pediluvium gives considerable relief under this complaint ; but the water ought not to be too hot, nor long continued. The erect posture is of much use in moderating it ; and the complete eruption of pustules frequently removes the complaint. If the pain is not considerably alleviated by the above evacuations, &c. a few leeches must be applied to the temples, which seldom fail giving the desired relief.

Delirium.

Delirium more or less attends every bad kind of small-pox, but requires a very different treatment in the different species of that disease. When attended with symptoms of high inflammation, it is moderated by the antiphlogistic and evacuating course, cool air, and the erect posture, which last, if it cannot be altogether obtained, by reason of the severity of other symptoms, the patient's head and shoul-

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ders ought to be supported with pillows. The horizontal posture being always unfavourable to this symptom, and often increasing it, points out its cause in part, *viz.* too great a determination of blood to the head, which is considerably promoted by this position, and which, in conjunction with the rapid circulation, a multiplicity and confusion of ideas are produced : the truth of which supposition receives further credit, from the means used by which the symptom is commonly relieved, *viz.* plentiful bleeding, both general and topical, the erect posture, and cooling purgatives.

Dr Lobb gives the case of a woman under small-pox of the distinct kind, where delirium appeared among the first symptoms, continued till the termination of the disease, and was only removed by a discharge of the catamenia *.

The *delirium* accompanying small-pox of the putrid, or other kinds where low fever prevails, is to be treated in a very different manner ; in such cases, bleeding would

* Lobb on the Small-pox, p. 254.

would be highly pernicious, and the intestinal evacuation, though necessary in other respects, must be regulated with caution; the patient can receive no benefit from the erect posture, but is rather hurt by it. The delirium therefore in this kind of small-pox, is to be relieved by an opposite treatment; for these great exertions in tossing about his limbs, and in the clamour and strength of his voice, are deceitful appearances, and he can only be quieted, and that false show of strength reduced, by a cup of wine, wine negas, or white wine-whey, according to his age, or habit, which soon disposes him to quietness, as if he had taken an opiate.

There frequently does occur a stubborn delirium in cases of crystalline small-pox, where, although the pulse is feeble, and the fever apparently low, by a peculiar determination of blood to the head, we have evidence of some degree of fulness, and even inflammation within the cranium. In this case, as we hinted under the treatment of crystalline small-pox, the patient is sometimes relieved by topical

bleeding, and where the belly is slow, by a gentle purgative.

Some good writers have observed, that delirium sometimes originates from an accumulation and acrimony of bile in the stomach and intestines ; when, from the symptoms of nausea, and vomiting attended with costiveness, we have reason to apprehend this as the cause of delirium, it is to be relieved by cathartics.

Coma.

Coma is a symptom more or less occurring in inflammatory small-pox, when the eruptive fever is considerable, and other symptoms violent. Children are more liable to it than adults. We view it as arising from increased impetus and determination of blood to the brain, and it is relieved by the same method of treatment mentioned under *cephalalgia* : But as in general, in such young subjects, there is less necessity for opening a vein, the application of a leech or two, to the neck or temples, will answer the same intention ; after

after which, the bowels ought to be emptied by a clyster, or cooling purgative, which have the best effect in relieving this complaint.

Sydenham observes, that a coma in children frequently precedes small-pox of the confluent kind, in which case he recommends the application of a vesicatory, and gives an opiate; but as the confluent small-pox is always the consequence of a copious fermentation, which discovers itself by the severity of the symptoms, the antiphlogistic course by bleeding and cooling purgatives, gives the most speedy relief under this alarming symptom.

But though children become comatose from the above cause, the same symptom sometimes occurs, when there is no evidence of inflammation. This case we noticed under *symptoms preceding eruption*, and is generally attended with imminent hazard, the young patient is often carried off before the eruption appears, the vis vitæ being insufficient to propel the contagious particles to the skin; or if a slight eruption takes place, it quickly disappears, and the child dies comatose or lethargic.

This case requires a very different mode of treatment from the former. Here we have little or no fever or unusual heat, but a considerable degree of languor, heaviness, and oppression, want of appetite, and sometimes nausea, in which case, a gentle puke, if seasonably administered, is of use; the application of a vesicatory to the neck, a cup of white wine-whey, or other light cordial, may be given. If these means are successful in raising the pulse, and forwarding the eruption, the same regimen is to be continued through the course of the disease. As this want of energy in the system always occasions a slow belly, we are not in this case under the necessity of purging, but are rather to avoid evacuations, as the fermentation is never extensive in habits of this kind, and therefore it will be sufficient to open the belly by a clyster once in two or three days.

Phrenitis.

This symptom does occur at times in this disease, and it is surprising it does not oftener take place, considering the inflammatory and stimulant quality of the contagious particles of small-pox, its influence on the brain and meninges, especially when the assimilation is extensive, or concurs with the phlogistic diathesis, when the disease is left to nature, or treated with heating things, and no attempt made to moderate the inflammation, or to diminish the excess of the contagious fluids.

It is always accompanied with acute fever, and constant fierce delirium. The patient cannot bear the light, not even of a small taper, without exquisite pain. The carotid arteries are in some cases observed to beat with violence, even when the artery at the wrist is small and contracted. A fiery red colour may be discerned in the bottom of the eyes, from the inflammation and enlargement of the blood-vessels on the retina. The conjunctiva is in

the same state, and the eyes watery. Drops of blood frequently fall from one or both nostrils ; and the patient is distressed with constant watchfulness. In some bad cases, there is an appearance of light, and sometimes of flame about the bed, however dark he may be kept ; this is a bad symptom, and indicates high inflammation, yet it has been known to yield to the antiphlogistic and purging course.

The later this symptom comes on, it is esteemed the more dangerous, which is a powerful argument for early evacuations, both by repeated general and topical bleedings, cooling purgatives, and a strict attention to every part of the antiphlogistic regimen. When this course is too long neglected in cases of bad small-pox, there is always hazard of suppuration, and a deposition of pus upon the brain, which generally ends fatally.

The learned Dr Mead observes, ‘*Phrenitis quarto post pustulas exclusas die accedens pessimi omnis jure habetur ; ut qui hoc periculo conflictatus ad sanitatem per venerit fere neminem se vidisse dixerit doctorissimus Freindius.*’ At firmissime assieve ‘ rare

' rare possum, rem hanc melius mihi cef-
' sissem; qui multos eo tempore delirio cap-
' tos, detracto quamprimum sanguine, et
' infuso in alvum clystere, salvos præstite-
' rim *.'

Angina.

Angina is a common attendant on all kinds of small-pox, even the mildest sort is not exempted from it. It generally commences with the eruption, or a short time before it, and appears to arise from the irritation of the contagious particles applied to these parts. It has the appearance of a slight inflammation, which resolves in the course of a few days after the eruption is completed; in some kinds small pimples arise, but seldom come to suppuration. The inflammation of these parts is relieved by moistening the throat frequently with fig-tea, gently acidulated with the juice of lemons, apple-tea, or a little of the patient's ordinary drink.

The angina that accompanies the worst kinds of small-pox, is both more acute and obstinate.

* De Variolis et Morbillis liber, p. 36, 37.

obstinate, and, from its affecting the *glottis*, frequently brings on a considerable degree of hoarseness. It is increased from the tumefaction and inflammation of the fau-
cial glands, and continues till these subside. This symptom is moderated by the anti-phlogistic regimen, bleeding in inflammatory habits, and especially by the early purging course, by which the contagious fluids are discharged, and of consequence both the inflammation and swelling of the parts are removed.

Dyspnœa.

Dyspnœa is an alarming symptom in small-pox, and seldom occurs but in the worst kinds, and in the last stage of the disease, especially when it is left to nature, or improperly treated in the preceding periods. In cases where the lungs are naturally weak, or the thorax narrow and contracted, it may appear at an earlier period of the disease. In inflammatory small-pox, this symptom appears to originate from the rapid circulation of the blood through

through the pulmonary vessels, and from a distension of the blood-vessels of that organ.

In inflammatory cases, this severe and threatening symptom is relieved by the antiphlogistic and evacuating course ; bleeding freely in such cases is absolutely necessary, as well as diminishing the excess of the contagious fluids, by cooling purgatives ; these, by relaxing and emptying the vessels, are well suited to remove the causes above specified.

When this symptom occurs where the fever is moderate, or in persons subject to a habitual cough, or asthmatic complaints, and we have reason to apprehend increased secretion from the bronchial glands, with difficult expectoration ; the symptom is relieved by a gentle emetic, by diuretics, or the application of a vesicatory to the breast, or between the shoulders. The application of cool air is also of much importance in this complaint, as is the erect, or reclining posture.

Pain in the Region of the Stomach.

This is one of the pathognomonic symptoms of small-pox, and constantly attends those kinds where the assimilation is extensive: as it always appears early, it portends a numerous eruption; its continuance for a shorter or longer time, depends much upon our mode of management. Sydenham was the first who took notice of this symptom; Van Swieten is of opinion, that it originates from the contagious particles being intangled with the saliva, and swallowed with that fluid adhering to the superior orifice of the stomach, or even the interior surface of that organ; but the pain is not acute, rather dull, and frequently not much felt, but upon pressure, and is commonly attended with a sense of fulness and weight. It seems to originate from an accumulation of blood in the interior parts of that region, as we often find the symptoms speedily removed by bleeding and promoting the intestinal discharge, by which the stricture is taken off the vessels, and a

more

more free and equal circulation promoted; whereas, if these evacuations are too long neglected, the pain continues for several days.

Lumbago.

We may consider *lumbago* as a pathognomonic symptom of small-pox; for altho' it is a disease of itself, and frequently accompanies both intermittent and continued fevers, it is seldom or never altogether wanting in bad cases of small-pox; it prevails especially in sanguine and inflammatory habits; hence Sydenham observes, that where it is wanting, the patient has an acute pain of the side, resembling pleuritis, or flying pains through the body and limbs. It appears in an early period of the disease, and generally comes on suddenly. We form the prognosis of a violent disease, when lumbago is sudden and very acute, which commonly happens in small-pox of the confluent, and other bad kinds. Van Swieten quotes an observation of Hippocrates, which shews in what point of view he considered this symptom in

in general, as he knew nothing of the small-pox. ‘ Lumborum dolor, sine causa
‘ manifesta celeriter invadens, maligni
‘ morbi signum *.’

Where this symptom prevails in any considerable degree, we commonly find the pulse quick, hard, and strong, which admits of bleeding freely, and other evacuations. When costiveness occurs, the symptom is sometimes relieved by a laxative clyster; even clysters of tepid water once or twice a-day, have been found useful, or a bladder of tepid water applied to the part; but it is most effectually relieved by the complete eruption of the pimplies.

Swelling of the Hands.

This frequently takes place in bad kinds of small-pox, that are treated in the common way. Sydenham considers it as a necessary symptom of the disease, and in enumerating the advantages of opiates in this distemper, he tells us, ‘ Dein, ab eo-
‘ rum

* Comment. in Aphor. &c. § 1383. p. 44.

‘rum usu, faciei et manuum intumescentia,
‘quam insignem, in hoc morbo, natura ha-
‘bet evacuationem, rectius procedit,’ &c.*.
It is indeed an effect of the frequent ad-
ministration of opiates ; but it is no more
a necessary symptom of the disease, than
swelling of the face, or secondary fever
are ; but is merely a consequence of im-
proper management, and chiefly from the
want of due and seasonable evacuations.
When it occurs in ordinary cases, it is e-
vidently a translation of some part of the
morbific matter from the head, throat, and
other parts, to the hands, and so far be-
comes a favourable determination, as it
gives a partial relief to the former, which
had been greatly overloaded and oppres-
sed. But I never saw this symptom occur
even in very bad kinds of small-pox, where
the antiphlogistic and evacuant course had
been strictly followed from the begin-
ning.

* *Opera Universa*, p. 155.

Suppression of Urine.

Suppression of Urine, is a symptom that frequently occurs in the different kinds of bad small-pox ; it arises from different causes, and from none more frequently than bad management in the beginning of the disease, as the neglect of bleeding, and timely evacuations, keeping the patient much in bed, or too warmly covered. The general tumefaction of the body, contributes likewise to this complaint, by which a certain inertia is produced, and the abdomen being over distended, its muscles have not a proper action upon the bladder.

As this symptom is commonly attended with a costive belly, a laxative clyster, for most part, gives relief ; but where the above causes continue to operate, the symptom is most effectually relieved by promoting the intestinal discharge. If the patient has been soaked too much in bed, or kept too warm, Sydenham's advice is often useful, to take him out of bed, supported by a couple of assistants, and exposed in his

his shirt to the cool air, which in a short time promotes the urinary discharge.

Convulsive Fits.

These occasionally happen in children, a few hours previous to eruption, and seem to be the effect of variolous contagion acting upon the nervous system, in some weakly and delicate habits. The symptom, however slight, is alarming, seldom dangerous at this period, unless by its long continuance, repetition, or improper management. Most practitioners view this symptom, however alarming, in a favourable light, and think that it commonly presages a mild disease: I believe the observation is just, and may be accounted for, from the symptom generally occurring in weak and irritable habits, where, for most part, the assimilation is moderate, and of consequence the eruption of pustules few.

Sydenham considers a convulsive fit to be an effort of nature to propel the morbid fluids to the skin. It indicates a struggle, wherein nature for a short space

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seems

seems to be overpowered, and an imbecility of constitution that is often conjoined with a weak and irritable system of nerves.

In this case, bleeding is to be avoided, nor is any other evacuation necessary, than to procure an easy motion of the belly once in two or three days.

The application of a vesicatory to the neck, has been recommended; there are two objections to this remedy: *1st*, The fit is often of so short duration, that it is over long before the vesicatory can have the least effect: *2dly*, If the eruption appears before the cuticle is raised by this application, in some cases, it may retard the eruption, and become an additional source of distress to the patient for several days.

The surest and most effectual antispasmodic in cases of this kind, is opium; but as the patient is unable to swallow any thing during the fit, the best way of exhibiting it is by clyster; the quantity of Thebaic Tincture proportioned to the child's age, being mixed with a small quantity of white wine-whey.

If

If the state of the skin has any influence in retarding the eruption, and so giving rise to this struggle of nature, the tepid bath may be of service, after which the skin may be gently chaffed with a warm dry linen-cloth. But as this alarming symptom more frequently originates from a weak and irritable habit, exposing the patient to cool air, has been found useful in restoring the powers of life quickly; and where the fit happens to be more tedious and obstinate, it has been quickly removed, by a single dip in cold water.

As in particular constitutions, and sometimes in strumous habits, we have a recurrence of the fit once or twice a-day; if we have reason to suspect the whole of the variolous contagion is not exhausted in pimples, but continues still to irritate the system of nerves; as the excess, in this case, is not to be carried off by the intestinal discharge, the inducing and keeping up a gentle moisture on the skin, is of considerable use, both in preventing the return of the fits, and of weakening their force; for

this purpose, the following sudorific has been found to answer well.

R. Magnes. alb. scrup. i.
Pulv. Ipecacuan.
Opii utr. gr. i.
Tere simul ut fiat pulv.

To a child of one year, three grains of this powder may be given in a little syrup or panada, and repeated twice in twenty-four hours, with a little sage-tea, or weak white wine-whey. The dose to be proportioned to the age of the child.

C H A P.

C H A P. XII.

Of the Use and Abuse of Opiates in Small-pox.

SYDENHAM appears to have been the great patron of opiates in small-pox ; he speaks so highly in their favour, and with so much confidence of their good effects, in almost every period of the disease, that from his known candour, sagacity and judgment, we are ready to be prejudiced in favour of his opinion, even against the dictates of reason and common sense. But though Sydenham differed so widely from all his cotemporaries in the treatment of this distemper, it evidently appears, by the frequent use he made of this medicine, that he was not altogether unshakled from the mode of practice which universally prevailed in his time ; and as his works met with a favourable reception from the public, the cool regimen, though clogged with the frequent administration

of opiates, in a course of time, came to be generally received and practised, both in this and foreign countries.

The constant use of this drug, by those who adhered to the hot regimen, and likewise retained by all who followed Sydenham in the antiphlogistic course, was sufficient to lead, or rather to mislead, most of the medical practitioners in Europé, as in fact it has done; which is the best apology that can be made for adopting a practice inconsistent with the known method of treating every other inflammatory disease.

Although opiates were recommended by Sydenham in almost every stage of the disease, he is of opinion the patient ought to be above fourteen years of age, before they are exhibited freely; but it does not appear that he adhered strictly to this rule, see the case of Mr. Grossé, p. 330. but he informs us, that in grown up persons, or after the age of puberty, the free use of them, is attended with the following advantages :

‘ Primo somnum moderate conciliando
‘ efferam nimis sanguinis ebullitionem, ac
‘ proinde

‘ proinde phrenesin; cohibent, præcavent-
‘ que.—Dein, ab eorum usu faciei et ma-
‘ nuum intumescentia, quam insignem in
‘ hoc morbo, natura habet evacuatōnem;
‘ rectius procedit.—Quin etiam, quod non
‘ parum facit ad aëgri securitatēm, cum
‘ non raro justo citius detumescat faciei
‘ cum malis aëgri frēbus, tumor, narcotico-
‘ rum ope ad debitum usque naturāe termi-
‘ num, subfulcitur et protrahiatur; mitigato
‘ enim sanguinis fērvore, radii inflammati
‘ opportune ad manus, faciem, atque om-
‘ nem corporis superficiem, pro morbi in-
‘ genio feruntur.—*Ptyalisnus* denique hisce
‘ propagatur qui, licet vi medicamenti ita
‘ fortiter incrassantis ad horas aliquot fisti-
‘ tur, in quibusdam; mox tamen, aucto
‘ novis hisce suppetiis robore insurgit de-
‘ nuo natura, et cœptum opus feliciter per-
‘ agit. Quin etiam animadverte, saliva-
‘ tionem, quæ circa diem undecimum, ali-
‘ quando etiam citius, cum ingenti aëgri
‘ periculo minui solet, exhibetis, plus se-
‘ mel, paregoricis de nova fuissē redinte-
‘ gratum, nec ante diem decimum quar-
‘ tum, alicubi etiam et post illum, desissē.
‘ Propino ego ut plurimum vel laudani li-

quidi guttas xiv. aut circiter; vel syr. de
 meconio unc. i. in aq. flor. Paralyf. vel
 simili stillatitia solutam: quæ si adultis,
 post plenam eruptionem ad morbi usque
 finem, singulis noctibus, propinentur, non
 modo incommodi nihil, sed et magnum
 inde emolumentum capient, quod fre-
 quenti experientia didici. Expedit vero,
 ut censeo, paulo temporius quam aliter
 fieri solet paregoricum exhibere; facile
 enim observatu est in variolis pessimi-
 moris, caloris, ut ita dicam, paroxys-
 mum vesperi plerumque ægrum inquie-
 tudine, anxietate, aliisque symptomatis
 laceffere; quæ, si paregoricum, hora sex-
 ta septimave vespertina, sumatur, aliqua-
 tenus præcaveri possint *.

Quapropter medicamenta paregorica
 æque indicari in variolis confluentibus
 mihi videtur, ac indicatur quodvis reme-
 dium in quovis morbo; cum hic quasi
 specifica sint, perinde ac cortex Peruvia-
 nus in febribus intermittentibus: quam-
 vis haud ignorem paregorica non virtute
 aliqua præcise specifica operari, sed iste
 solum

* *Opera Universa*, p. 155, 156.

' solum indicationi respondendo, qua san-
' guine et spiritibus consopiendis, et in or-
' dinem redigendis operam damus. Atque
' hic quidem sanguinis et spirituum motus
' inordinatior (variolarum confluētum in
' adultis comes individuus) anodynōrum
' usum præ ceteris depositit; necdum ei
' satis innotescit hujuscē morbi genius, qui
' ista vigiliis tantum deberi existimat *.

' Neque vero hoc reticebo, quod, in ul-
' timis diebus variolarum egregie confluē-
' tium, quandoque nēcessē habui etiam ter-
' in spatio diei naturalis, *i. e.* octava qua-
' que hora narcoticum exhibere; quando
' scilicet vel ob violentum spirituum orgas-
' mum, vel ob eorumdem confusione, æ-
' gritudinem aliqualem inducentem, lon-
' giora ab usu ejus intervalla haud conce-
' derentur, &c. †.

* Dissertatio Epistolaris ad D. Cole, p. 371, 372.

† Ibid. p. 375, 376.

Case from Dr. Sydenham illustrating the above practice.

‘ Aprilis 13. Anno 1681. Quædam e
‘ nostra vicinia, nomine *Croſſe*, ad me ac-
‘ cedens atque flens, obnixe petiit, ut fi-
‘ lium ejus decennem adirem, qui a die
‘ quarto male habens, variolis, ut ipsa me-
‘ tuebat, jam laborabat. Ego a podagra,
‘ quæ me tunc temporis excruciat, de-
‘ tentus, pharmacopolam; quo uti soleo,
‘ rogavi, ut ægrum inviseret, ac mihi de
‘ ejus statu referret: rediens ille mihi nar-
‘ ravit, pueri matrem, e nescio cujus mu-
‘ lierculæ consilio, pulverem comitissæ, et
‘ alia calidiora remedia, filio propinasse;
‘ quin et stragula adjecerat matris indul-
‘ gentia, sub quibus quasi defossus latebat
‘ æger, ut horum pondere sudores (ad quos
‘ ceu ad facram anchoram in hoc morbo
‘ fœminæ confugiunt) exprimeret; ad hæc
‘ magnam posseti calentis vim, floribus ca-
‘ lendulæ et cornu cervi incoctis, ægro in-
‘ fuderat; unde adaucto febris calore, tan-
‘ tam spiritibus confusionem induxerat, ut
‘ præter modum deliraret æger, totis ad-
‘ stantium

stantium viribus vix lectulo adfixus, ac
incondita quædam, furentium ad instar
submurmurans. Nondum tamen in lucem
prodibant exanthemata, vel saltem ob-
scure, sed denso agmine cutim impete-
bant; inhibita plane eruptione ab hac
methodo violentiore, quæ ad eam solici-
tandam, destinabatur. Jubeo ut e lecto
eximatur quanto ocyus, neque eundem
nisi noctu ingrediatur ante sextum diem:
dein ut *syrupi de meconio unciam dimidiā*
statim sumat, quo nihilum proficiente;
post horæ spatium eamdem dosin repeto,
at nullo cum fructu; quippe quod sanguis
tam immanni furebat orgasmo, ut non nisi
unciis duabus cum dimidia (spatio tamen
inter singulas semi-uncias interjecto, quo
liqueret, quid postrema dosis præstiterat)
intro adsumtis frænari posset; quo facto,
unciam dimidiā tantum singulis noctibus
hauriendam præscripsi usque ad finem
morbi; quæ quidem illam spirituum re-
quietem, quam crebrior exhibitio parave-
rat, tueri jam partam valebat. Unde
etiam convaluit æger *.

Boerhaave

* *Opera Universa*, p. 373, 374.

Boerhaave follows *Sydenham* in prescribing opiates in this disease; his indications in the second, or inflammatory stage, are concluded with these very opposite directions: ‘*5to, Regimine frigidiusculo, maxime admissū puri et frigidi aëris, interim corpore inferiore contra frigus munito.* Hæc autem statim et ab initio aplicanda sunt: *6to, Si nimia impetu fuerit morbus, opata vespertina quinta conducunt, reliquis simul, ut præscriptum est, actis *.*’

Van Swieten joins his testimony to the same mode of practice: ‘*Bona fide testari possum, quod in numerosa praxi pulcherimos effectus viderim opiatorum in curandis variolis: idem novi contigisse aliis egregiis viris, qui adhuc in vivis sunt, et felicissime artem exercent, cum quibus hac de re sæpius egi.* Alvum constipari a narcoticorum usu certum est; sed huic incommodo, clysmatibus, potu seri lactis cum tamarindis cocti, et similibus facile subvenire potui semper,’ &c. †.

In

* Aphorism. 1399. p. 353.

† Comment. in Aphor. Boerhaav. Aphor. 1399. p. 112.

In consequence of such high authorities, we need not be surprised to see this practice adopted by most of the physicians in Europe, both of the last and present century. Even Dr Morton, who differed so widely from Sydenham in every other particular in the treatment of small-pox, goes hand in hand with him in the administration of opiates: ‘ Ita nullam opiatorum dosin formidare, quo usque sensim progressiendo ad eam demum devenerimus, quæ somnum conciliet, et efferatum eorum motum quadantenus cohipeat, et sensim opati dosin diminuere pro gradu quietis redintegratae *.’ I must however be allowed to say, that Morton’s practice in this respect, was every way conformable to his general plan of treating the disease; but I can see no consistency in those who have seen the advantages of the cool regimen, exhibiting opiates so frequently as Sydenham and his followers do.

It may then be asked, Are opiates never to be given in small-pox? I answer, They may be given with apparent advantage, under the following circumstances.

I/7,

* Pyretolog. cap. viii. p. 77.

1st, As a considerable degree of pain frequently attends the mild small-pox, especially in children, from the peculiar irritability of their habit, which is in part relieved, by the general antiphlogistic course before recommended; but pain is also greatly alleviated in these subjects, by an evening opiate.

2d, The influence of variolous contagion upon some habits, where the disease is mild, in producing *watchfulness*, cannot have escaped the observation of every attentive practitioner; in this case, an opiate may be given with good effect; and although there is no indication for purging in the mild disease, it is the safest course, where the belly is slow, to precede the evening opiate with a laxative clyster at least every second night.

3d, In cases of flatulency and cholic pains, which many children, especially infants on the breast, are liable to under small-pox, we are obliged to have recourse to a gentle opiate occasionally; but as in affections of this sort, an open belly is necessary,

cessary, the effects of the opiate ought to be counteracted by clysters, or small doses of magnesia alba, and rhubarb.

In short, in every case where there is no indication for much evacuation, a gentle opiate may be given with advantage, as it eases pain, obviates watchfulness, and tends to relieve the intestines in a flatulent state.

But in every species of small-pox, where all the symptoms are violent, with a numerous eruption of pustules, whether of the contiguous, confluent, or other kinds, where we have clear indications of an extensive fermentation, we consider the exhibition of opiates to be highly pernicious, for the following reasons:

1st, As they stand in opposition to the antiphlogistic plan of cure. In every case of small-pox, attended with inflammatory fever, where we find a considerable tension on all the solids, accompanied with cephalgia, delirium, angina, or internal inflammation of other parts, we evidently see the patient relieved by bleeding, and every symptom aggravated by opiates. It is surprising

prising the advocates for the cool regimen do not attend to the inconsistency of clogging this course with a medicine so contradictory to the end they are labouring to obtain.

Whatever influence a dose of opium may have in producing a temporary stupefaction, or even in contributing to relax the stricture induced upon the arterial system in some fevers; yet as every variolous fever, whether preceding eruption, or following it, constantly originates from irritation of the contagious particles; and as there is no specific virtue in opium, that destroys the power of this contagion, it must always exert its ordinary effects, while suffered to remain in the system: But by the frequent repetition of opiates, the contagious matters are much longer detained there, than if the small-pox had been left to nature; hence the disease is protracted by the frequent use of opiates, and most of its symptoms made worse.

2dly, As we have shown above, that in a disease where bleeding is indicated, opiates must be hurtful; in like manner, where

where purging is pointed out, they are an absolute contradiction.

If the theory of the disease laid down in the preceding part of this work, which I have endeavoured to establish upon facts, is just; if the eruptive fever, and the whole train of symptoms accompanying it, are first excited, and afterwards kept up by an excess of the variolous particles; then it must appear, the sooner this excess is evacuated, the sooner fever, and every other symptom, however violent, will be moderated; but by the frequent use of opiates, these morbid particles are locked up in the system, by which fever and every other symptom are kept up.

The violence of the fever, the great anxiety, restlessness, &c. that commonly attend the worst kinds of this disease, seem to have led Sydenham into the habitual use of opiates, in order to quell the tumult in the system, and to produce a temporary calm; but it must occur to the attentive practitioner, that the short and oppressive sleep (if it may be so called) obtained by the use of opiates, is purchased at too high

a rate, by the fatal consequences that so frequently attend this mode of practice.

3dly, By prosecuting the antiphlogistic and evacuant plan of cure, recommended in the preceding sheets, opiates are rendered unnecessary. By a steady attention to this course, the exciting cause of every bad symptom being gradually carried off, we shall find little or no occasion for the use of opiates in any stage of the disease. It is scarcely to be credited, how much natural rest is obtained, even in the worst cases of small-pox, by pursuing the cool regimen, with the daily purging course, from the commencement of the disease. The celebrated Tissot, who is one of the few authors that oppose the general exhibition of opiates in small-pox, is of opinion, that even natural sleep is hurtful in this disease; I can see no bad consequence that can arise from quiet and natural sleep in small-pox; it is indeed seldom obtained, because the common method of treating the disease prevents it; and Sydenham's, or even Morton's repetition of opiates, till the patient is seemingly quieted,

ed, can produce no other than a disturbed and oppressive slumber, from the too great fulness and distension of the vessels, as well as from the rarefaction of the fluids contained in them. If this is the case, we plainly see, how these oppressive slumbers may be prevented, *viz.* by pursuing the antiphlogistic course; for by plentiful bleeding, and daily purging, the patient is gradually disposed to soft and quiet rest, in proportion to the emptying of the vessels; and sleep obtained in this way, is so far from being pernicious in any period of small-pox, that it is of the greatest use in promoting the kindly maturation of the pustules; whereas it is found in experience, that long watchfulness, or the want of refreshing rest, interrupts this good effect, and increases the inflammation of the pustules, and irritation upon the whole nervous system.

From what has been observed, there is no leading indication for administering opiates in small-pox, unless in the circumstances before mentioned, where the evacuant course is improper; they may likewise be used in every case, as a powerful

cordial, where the *vis vitæ* appears to fail. The late Dr George Young has an excellent observation to this purpose: ‘The *vis vitæ* (says he), and the *vis morbi*, are sometimes so equally balanced, that one dose of *opium* will save the patient, when bleeding would be fatal. I am persuaded that *opium*, and even other cordials, have frequently had this good effect in the small-pox and measles *.’

I shall conclude these observations with a case from Dr Tissot, illustrating the bad effects of opiates in the small-pox.

‘Vere anni 1754, ruris accersitus pro nobili quinquagenario ægro, qui, septimam morbi diem agens, narcotica sua su duorum aliorum medicorum usurpabat, anginam inveni quæ ante aliquot horas orta deglutitionem et potum jam impeditiebat. Venæ sectionem frustra suasi. Narcotica per viginti quatuor horas omitti obtainui. Plura applicabantur enemata, deglutiri potuit. Nona ad narcotica denuo configitur; occluduntur fauces post secundam dosin. Decima delirat,

* Treatise on Opium, p. 162.

‘ rat, nulli remedio patet aditus, venæ sec-
‘ tionem frustra sollicito. Usu enematum,
‘ et prohibito narcoticorum deglutitione
‘ post aliquot horas biberi potuit; at dia-
‘ codium potui miscebatur; accedit anxi-
‘ etas, increscit delirium; denuo obstruitur
‘ pharynx. Duodecima lethargus. Confi-
‘ lio quinque medicorum tunduntur venæ
‘ pedis et brachii, at sero; apponuntur
‘ cantharides quibus frustra intercessimus
‘ medicus ordinarius et ego; pelle verve-
‘ cis coram excorticati, plebeio, stulto, no-
‘ civi: confilio involvitur. Noctu sterter,
‘ mors *.’

* Tissot de Variolis, &c. pag. 20.

C H A P. XIII.

Of the Secondary Fever.

THE *secondary fever* is a period of the disease under consideration, the most critical and important, and therefore requires a particular discussion ; it commences with the complete suppuration of the pustules, or more properly, when these are perfectly full, stretched to their utmost extent, and unable to admit more of the assimilated fluids, whatever is the condition of the humour contained in them, whether in a state of crudity or maturation.

This fever does not occur in every species of small-pox ; it is never seen in the mild kind, and seldom in the disease by inoculation, unless where the pustules are numerous ; the reason of which is, that the whole of the morbid matter is thrown out of the circulating mass, and exhausted in pustules, &c.

Sydenham

Sydenham confines the secondary fever to the confluent small-pox; but whether the disease is of the contiguous, confluent, or of the other kinds, where the assimilation is extensive, there will always be a large crop of small-pox, which is constantly followed by an accession of fever, when the pustules are at their full stretch, and incapable of admitting more of the contagious fluids, unless a proper mode of treatment has been employed in an early period of the disease, to obviate this symptom; the consideration of which, shews that the secondary fever is no more a symptom necessary to the disease, than swelling of the head, face, fauces, or hands, which all derive their origin from an excess of contagious matters in the system.

It will therefore be of importance, to have the true source of this feyer ascertained, as by substituting a wrong cause for the rise of it (which I am apt to think is done by the generality both of authors and practitioners), we cannot possibly give that relief to the patient, which the exigency of his case requires, in this critical and dangerous stage of the disease; where-

as, if the true and proper cause of this fever is known, we have it in our power, not only greatly to moderate, but often to prevent it altogether; and as this can only be effected in a consistency with the theory of the disease laid down in the former part of this work, it proves, beyond a doubt, the truth of that theory, and may be considered as a valuable acquisition to the healing art, in the cure of many of the worst kinds of small-pox, by which many thousands annually fall victims to the disease, who may be preserved to their friends, and become useful members of society.

In treating upon this important period of the disease, I shall,

1st, Shew the cause assigned for this fever, by some of the best writers on small-pox.

2^d, Offer my objections to the common received doctrine upon this head.

3^d, I shall endeavour to point out the apparent origin of the secondary fever, in

a consistency with the theory of the disease laid down in the preceding part of this work.

First, It is remarkable that the sagacious and attentive Sydenham, takes little or no notice of this fever in his first pieces on small-pox ; he mentions it in his epistle to Dr Cole, relating the case of Mr Thomas Chaut * : And in his last piece, *De Febre putrida Variolis Confluentibus superveniente*, he observes,

‘ Attamen (quod sane dolendum est, cum
‘ florentissima hominum ætas hac fere
‘ strage deleatur) tum his, quæ præcipi-
‘ mus, tum aliis omnibus, quæ hactenus in-
‘ venit ars medica, præcidiis nihil profi-
‘ cientibus; sæpen numero æger, licet usque
‘ eo non admodum periclitetur, tamen vel
‘ undecimo, quod usu venit, die, vel alio ali-
‘ quo istorum, quos variis speciebus vario-
‘ larum confluentium ceu *magis* fatales ad-
‘ signavi, vehementi febre corripitur, una
‘ cum suffocatione et jactatione inquietissi-
‘ ma,

* Sydenham Oper. pag. 379.

‘ ma, et de tanta spē decidens subito mori-
‘ tur, attonitis, et stupentibus amicis, qui
‘ ad hoc usque punctum ægro bene omina-
‘ bantur. In frangendo improviso hoc mor-
‘ bi impetu, cum prius in omnia fecerit,
‘ quibus præcaveri potuerat, maximopere
‘ desudabit medicus. Quem in finem serio
‘ perpendendum est, febrem illam adventi-
‘ tiam, quæ undecimo die variolis conflu-
‘ entibus laborantes adoritur, morbum esse
‘ tam ab ipsis variolis, quam ab ista febre,
‘ quæ vel earum eruptionem præcedit, vel
‘ primis nonnunquam diebus a phlegmo-
‘ narum inflammatione gignitur, prorsus
‘ diversum. Nihil enim est aliud, quam
‘ *febris putrida*, proprie dicta, particulis pu-
‘ trescentibus, et a pustulis jam adeptis
‘ maturitatem suam inquinatis, in sangu-
‘ nem, uti dixi, resorptis ortum debens,
‘ quarum noxia, et naturæ iniuncta quali-
‘ tate æger eodem tempore, et pessima fe-
‘ bre, et veneno lacefitur. Quamobrem
‘ ea sola in remediis huic malo cedere
‘ posse prudens quispiam existimaverit, quæ
‘ ad retundendam secundariam hanc *fe-*
‘ *brem*, quam putridam adpello, maxime
‘ faciunt. Id vero nihil efficacius præstat,
‘ quam

‘ quam copioso sanguinis eductio, quo pac-
‘ to vitiatae illae particulae, quae morbi sunt
‘ fomes, confestim e sanguine exulant.
‘ Neque huic praxi, siquid ego judico, va-
‘ riolae in quo jam sunt statu, vel minimum
‘ intercedunt: jam enim pustulæ nullo mo-
‘ do introrsum agi possunt; adeo ut si æger
‘ hoc morbi tempore fatis cederet, et ca-
‘ daver in terram frigidam exponeretur,
‘ attamen pustulæ jam in duritiem incru-
‘ statæ, nec intra cutem se recipere, nec
‘ minimam molis suæ partem amittere, po-
‘ terint. Nec sane cum variolis jam nobis
‘ res est, sed cum alio prorsus morbo,
‘ nempe *febre putrida*, &c. *.

‘ Post tolleratum decursum hunc (1396),
‘ sequitur status tertius suppurationis, quo
‘ incepta illa crescit et perficitur; in eo
‘ pustulæ jam purulentæ quotidie augen-
‘ tur, dein maturescunt, albescunt, flavent,
‘ ac tertio, quartove die hujus decursus,
‘ ruinpuntur. Tum vero toto pinguedudo
‘ et cutis puris scatet mobili, externe aret,
‘ locis liberis inflammatur; hinc impedi-
‘ mento perspirationis, circulationisque,
‘ irritatione

* Sydenham. Op. pag. 548, 549.

irritatione generis membranosi et nervosi,
absorptu puris in venas, fit febris pessimæ
indolis, cum pessimis symptomatibus; si
materies hæc purulenta sanguini mista
diu movetur, putreficit (82. 100. 406.)
hinc pro vario delapsu in diversas corporis
partes, diros effectus, vixque superabiles
producit; deliria, phrenitides, anginas,
peripneumonias, &c. *

Tiffot, recommending the opening of the pustules as a means of mitigating the symptoms, observes, ‘ Nec satis laudare possum
‘ bona quæ affert hæc methodus; Arabi-
‘ bus jam commendata, nonnullis deinceps
‘ osa aliis adamata et in primis egregio
‘ illo *Felici Platero* qui faciei tantum nito-
‘ rem respiciens probe monuit, *nisi maturius*
‘ aperiantur acu, *stilove acuto* (præstant for-
‘ fices) *pure retento caro exeditur, ulcuscula*
‘ *cava inde fiunt, cicatrixque foveam faciens*
‘ *relinquitur, &c.*—Sed alia est momentosa
‘ magis hujus methodi utilitas, Platero præ-
‘ tervisa; præcavetur nimiriū resorptio
‘ puris relaxata cute, remissisque doloribus
‘ maximus

* Aphorism. Boerhaav. 1400.

' maximus stimulus febris definit ; et sic
' accelerata detumescientia faciei et colli
' minus ad cerebrum congeruntur humo-
' res. Nec alia methodus secundam fe-
' brem certius sedaret quam si toto cor-
' pore omnes pustulæ indefinientur prout
' turgentur aperientur et dexterentur.
' Sed febris secundariæ naturam haud in-
' tellexerant ævo *Plateri* *.

Dr Hillary says, ' It is called the *second fever* in distinction from *the first*, as it succeeds that, and is of a different nature, and proceeds from a different cause. The first arises from the stimulation of the *miasmata* and suppuration of the pustules, but this from an obstruction and retention of the perspirable matter, and an absorption of the putrid variolous *fa- nies* from the pustules into the circulating blood, now in an inflamed fizy state, the effect of the primary fever.'

' For when the small-pox are of a malignant kind, and the pustules so many, that they cover most part of the surface
 ' of

* De Variolis, &c. pag. 42, 43.

' of the body, the greatest part of the per-
' spirable pores are obstructed, and conse-
' quently the matter which ought to be
' carried off by insensible perspiration,
' must be retained in the blood; whence
' the quantity of the circulating fluids,
' will be daily increased as perspiration
' diminishes, unless some of the other excre-
' tions, as these by urine, saliva, &c. be so
' much increased, as to equal that reten-
' tion, which rarely or never happens
' when the pustules are very numerous *.'

It is unnecessary to transcribe the sentiments of other authors upon this point, as every writer and practitioner that I have met with, enters into the same idea respecting the cause of the secondary fever, viz. *the absorption of the variolous matter from the ripe pustules.* We shall make a few strictures on the opinions of the above authors, before we proceed further in the method proposed.

Such as have paid attention to the second fever, will probably differ in opinion from Sydenham, and admit that *it is not a different*

* Practical Essay on the Small-pox, p. 96.

different distemper from the small-pox: For if, as he says, it proceeds from a transmission of the putrid particles into the blood, it must necessarily originate from the preceding disease; as a constant effect of it, when the eruption is numerous, and no means have been used for its prevention in the preceding periods of the disease.

In every case of small-pox, where a numerous eruption of pustules occurs, though some abatement of the eruptive fever is discernible upon the complete eruption of the pimples; yet in all such cases, we seldom or never meet with a perfect remission of fever; the pulse generally keeping up to 90, 100, or more in the minute; the accessory fever, therefore, which occurs about the 11th day, and raises the pulse to 120, 130, or 140, is no more than an augmentation of the present existing fever, and originates from the same cause. I object not to its being called *putrid*, as the long continuance of the preceding fever, cannot fail to attenuate the vital fluid, as we have formerly shewed, and which probably may be increased from the nature of the variolous ferment.

Sydenham's

Sydenham's method of curing this fever by *bleeding*, will be found inadequate to his intention, as I have often experienced; for if the second fever is occasioned by an excess of contagious fluids in the system, bleeding can only remove from the common mass, such a proportion of the morbid particles as is contained in the quantity of blood taken away. And if the fever is truly of the putrid kind, we should consider bleeding as highly improper. The only case then, where bleeding may be practised with safety and any chance of success, is when we have evidence of the phlogistic diathesis prevailing, which is sometimes the case in this fever.

We ought also to take into consideration, in this period, the state of the patient's strength; we may be assured, that, when a person has undergone a severe eruptive fever, as well as a continued fever during the suppurating state, he must necessarily be much weakened and reduced, and consequently very unfit to encounter a new accession of fever, of whatever kind it is, or to bear much evacuation by bleeding. In these circumstances,

ces, a more safe and easy method is to be fallen upon, to remove the irritating cause. The learned *Dr Freind* gives a good reason for preferring gentle purging in this case : ‘ Quia sæpe alias percepit vires ex alvo le-
‘ niter subducta minus quam ex missio
‘ sanguine imminuit : Etiam et neglecta san-
‘ guinis missione, hanc purgandi rationem
‘ feliciter posse teneri *.’ I shall only add to this judicious observation, that experience proves the truth of it, and that by Sydenham’s excessive caution in respect to purging, he exposed his patients to the most imminent hazard. Dr Freind, after a high commendation of Sydenham’s writings, justly observes : ‘ Ea vero, quæ a-
‘ pud illum *de purgantibus* in hoc variola-
‘ rum statu adhibendis leguntur, in eo
‘ opere proposuit, quod extreum publico
‘ dedit ; quasi ultimum esset animi sui ju-
‘ dicium, quod longinqui temporis usu at-
‘ que periclitatione firmaverat. In qua
‘ quidem medendi ratione ita parum te-
‘ mere processit, ut, si verum dicere liceat

Z

‘ non

* Jo. Freind Comment. novem de Febribus, &c.
comment. vii. pag. 170.

' non satis audax fuerat ; nam eam nimis
' arctis conditionibus astringit, nec nisi
' faceffente morbo, nisi decimo tertio, nisi præ-
' missa venæ sectione, fieri patitur, cum et
' sine sanguinis missione, et ante diem de-
' cimum tertium, et in summo morbi im-
' petu tutissime factum esse videremus :
' Sed hanc nimirum ille, uti fero admo-
' dum senex didicerat, ita paulo timidius
' et diffidentius adhibebat *.'

2d, We come now to offer some objections to the commonly received opinion, that the secondary fever arises from absorption of the variolous *pus* contained in the pustules, into the blood.

1st, At the commencement of this fever, and for some days after, we may observe, that most of the pustules, excepting such as may have bursted by pressure, &c. are replete with pus, and incapable of containing more. Had absorption in any degree taken place, we might expect a proportional depletion of the pustules within the above period ; but this is not the case, either

either on the body or extremities; and before this time, the pustules on the face are generally so much encrusted, that little or no moisture can be absorbed from them: Besides, many small-pox cases occur, where the secondary fever runs its course for some days, and terminates successfully, leaving the pustules on the body and extremities nearly in the same state they were at the commencement of the fever, which shews it did not originate from the matter of the pustules being absorbed into the system.

2d, The doctrine of the absorption of variolous pus from the pustules into the blood, after it has been deposited in them for eight days, is contrary to the common course and order of nature, as it occurs in other cutaneous eruptions; more especially in such as have been thrown out from the circulating mass, by means of previous fever, and may strictly be called *critical*. In the *measles*, *erysipelas*, and *scarlet-fever*, we may observe the matter of each of these eruptive diseases, to be gradually exhausted by resolution or exsudation;

tion ; during this process, were we, by the application of cold water, or other repellent medicine, to check the exsudation of the morbific matter in any of these cutaneous diseases, it would be at the risk of the patient's life. In like manner, the carbuncles and buboes that are thrown out of the system in the plague, (which distemper, Dr Mead alleges, bears a near affinity to the small-pox) and commonly terminates either by resolution or suppuration ; in the event of the matter of either being repelled, or absorbed into the circulating mass, the consequence must be fatal. In all critical phlegmons that come to suppuration, where the morbific matter is deposited on any particular part, it will either find a vent for its own discharge externally, or must be evacuated by art, as it would prove highly injurious to the system, to have the morbific pus returned into the circulating mass from whence it was expelled.

Internal suppurations of the viscera, are seldom so much within our reach, as to be evacuated by art ; but they are frequently discharged by the powers of the system :

system; and therefore, an abscess formed in the lungs, liver, or any of the other viscera, when the contents of these are not discharged by the trachea, intestines, or kidneys, a hectic fever is produced, whether from absorption, irritation, or both, I do not pretend to determine; but when the matter of internal abscesses is taken up by the lymphatic vessels, and transmitted into the system of circulating fluids, it cannot possibly remain there for any time, but is commonly discharged by some of the excretory organs: For illustration of this fact, I shall here relate a few cases which occurred under my own practice.

A young lady, born in the island of Nevis, was brought to this country, about twelve years of age, labouring under a liver-complaint; a tumour was evidently felt upon the right hypochondrium; the resolution of which was attempted for a considerable time, by mercurials, &c. but without the least success; the swelling increased, so as to become visible, prominent, and, at last, the integuments somewhat inflamed, and a fluctuation was

plainly felt ; an operation was determined ; in a short time, a purulent diarrhoea occurred, which, in the course of a few days, perfectly relieved my young patient, the swelling subsided, and her health was very quickly restored, and continued so far a few years ; she, however, went into the country, and relapsed into her former disorder, of which she died.

A young gentleman, twenty-five years of age, of a thin spare habit, after a tedious and severe fever, contracted a cough, which terminated in phthisis pulmonalis, which gradually wasted him. Two hours after his death, an abscess in his lungs bursted, and discharged itself by his mouth. As he was possessed of uncommon talents, and an intimate friend and companion, I could not help regretting that his life had not been protracted a few hours longer, when possibly the discharge of the abscess might have saved him : This was a vain thought. I determined, however, to improve the incident, by supporting the *vis vitæ* in all cases of the same nature, to the utmost of my power. I soon had an opportunity of putting my resolution in

in practice, and as the case is rare and singular, hope it will not be unacceptable to my readers.

A young gentleman, nineteen years of age, after contracting several bad colds during the winter, and not managing himself properly, fell into phthisis pulmonalis, which appeared at first to be extremely rapid; his cough was intense and severe, without any proper expectoration; his pulse frequent and feeble, and the colliquative sweats and diarrhoea commenced early, by which, in a short time, he lost his flesh, and was reduced to little better than an animated skeleton. He was removed from the city, into a free and well aired situation; his diet was chiefly made up of milk, fruits, jellies, and other light nourishment, and his strength supported by a strong infusion of the bark, with a small proportion of the tincture, and of the tinct. amar. gently acidulated with the elix. vitrioli; he was allowed a spoonful or two of claret at any time, either plain, or mixed with a little water. By such means, though in a low and greatly reduced state, he was supported for

some months. His urine was daily put in a strong beer glass, in which I one day perceived a very little pure white sediment, and upon this I directed the whole quantity to be preserved in glasses of the same kind ; the purulent sediment increased daily, till it came to fill one half of the glass, (about two and a half ounces) in the space of twenty-four hours : As this matter was discharged, the hectic fever subsided, he recovered his appetite and flesh gradually, his sleep was quiet and refreshing, and, in the course of some weeks, he recovered strength, and enjoyed many years of good health ; he afterwards, married, and had a family. I have in general pursued the same course in similar cases ; only in some, have taken away small quantities of blood occasionally, and in others, have opened a large drain by an issue, at the lower edge of the scapula, which contained 20, 30, or 40 peases, and by this means have been frequently successful, but oftener failed of a cure.

A manifest difference, however, must appear to every experienced and discerning person, in the nature, symptoms, and general

general appearance of *hectic fever*, arising from deep seated collections of matter in any of the viscera and joints, compared with the *secondary fever* of small-pox.

3d, In all those cases where the secondary fever occurs, and no diarrhœa intervenes, nor early evacuations substituted to carry off the excess of contagious fluids; but on the contrary, where a practice has been adopted, every way calculated to promote not only the swelling of the head, face, and fauces, but the general tumefaction of the body. In these circumstances, it is not easy to conceive how absorption of the pus from the pustules can take place; the whole series of vessels, sanguinary and lymphatic, being considerably distended, and of consequence the skin kept in a state of inflammation, all which effects must concur in preventing an absorption.

We apprehend no absorption can take place, where the vessels in general are full and distended, some degree of inanition of the vessels being necessary to promote the absorption of our fluids, either in respect
to

to a general plenitude, or when they are deposited in any particular part; the experience of practitioners demonstrate this; a curious experiment, long since practised in Venice, when the action of the absorbants was not so well understood as they are now, very clearly shews it: I have been assured from good authority, that a man in Venice, for a piece of money, showed their powerful action upon himself. He abstained from food for several days, till he was considerably emptied and emaciated; he was then suspended by the arms by a rope and pulley, and gradually immersed into a warm bath containing a decoction of meat, vegetables, and proper seasoning, and after continuing in it for some time, was drawn up apparently plump and refreshed. The judicious surgeon knows that in extravasations within the cranium, producing all the symptoms of a compressed brain, how much relief is frequently obtained by seasonable bleedings, both general and topical, opening clysters, and drastic purgatives. What effect does this evacuating course produce, but a general depletion of the sanguinary vessels.

vessels. But although we have daily experience of the absorption of various fluids deposited in different parts of the body, I should consider the absorption of contagious particles, accidentally received into the habit, and by the powers of the machine, thrown out upon the surface as injurious to the system, to be contrary to the general course of nature's operations; which common, and prevailing opinion, ought to be supported by some degree of evidence, in place of resting it upon mere assertion.

4th, To what has been advanced upon this argument, we shall subjoin another consideration, taken from the condition of the pus in the pustules at this period, which renders its absorption still more improbable.

The tenacity and consistence of the variolous pus at that period when the secondary fever commences, renders it improbable that it can be received within the mouths of the absorbents. It will appear obvious to every one who has attended to this circumstance, that from the formation
of

of pus in the pustules, but especially for two days before their complete maturation; that there is more or less, a daily exudation of the thinner parts of the pus from the pustules; this is evident from their change of colour, and the gritty roughness that is to be felt on their apices; it is likewise demonstrated from the morbid effluvia being more discernible at this period, than in any of the former stages; and that at this time, infection is more readily communicated than at any other. We may likewise judge of this fact, from the aptitude of the pustules on the face, to form into dry and solid crusts. If, therefore, there is a transudation of the thinner parts of the pus from the pustules, what remains, will be left in such a state of viscosity, as will render it incapable of being absorbed.

For the above reasons, I am obliged to dissent from the general and prevailing opinion, that the secondary fever originates from absorption of the variolous pus from the pustules.

We shall next consider, whether the retained perspirable matter has any influence
in

in the production of secondary fever, according to the doctrine of Boerhaave, Hilary, and others.

When the far greater part of the surface of the body is covered with maturing pustules, it may be considered by some, as giving a check to the secretion of insensible perspiration; but if this is the true cause of the secondary fever, it must have operated in producing this effect long before the 11th day.

According to Dr Hillary's calculation, taken from Roger's statical experiments, the medium sum of daily perspiration in summer, is 63. ounces, and of winter 51. From the consideration of the state of the body in every bad small-pox case, we may reasonably allow, the calculation for summer will best apply to them.

If, therefore, a numerous eruption of pustules prevents a discharge of the perishable matter, it must produce this effect soon after the eruption is completed; the consequence of which will be, that in place of an abatement of fever, which generally more or less takes place upon the eruption being completed, from the accumulation

mulation of 63 ounces of retained perspirable matter in the system, and that multiplied daily during the suppurating state, there must constantly be a great increase of fever several days before the 11th, which seldom or never happens.

It is not easy, therefore, upon this principle to conceive, how the human frame, already overpowered with a violent disease, could possibly subsist under the daily addition of near 4 pounds of retained perspirable matter, which from its own nature and ordinary effects, independent of any other disease, but in this case, accumulated with the contagious fluids, could not fail to heighten their inflammatory disposition with an immediate increase of fever. There is indeed a well known law of the system, that the diminution of one excretion, is often counterbalanced by the increase of another; and this in part, shews the necessity of promoting other secretions in an early period of this disease, as has been formerly observed.

But although the body is covered with variolous pustules, it does not appear that these altogether interrupt insensible perspiration;

spiration; the constant peculiar factor that accompanies small-pox, more especially the worst kinds, is a proof of this. *Cotunnius* observes, that a disagreeable steam or vapour is common to all the worst kinds of small-pox; and relates from the *Medicinae Septentrionalis* *, that the father of Bontius, who was above 70 years of age, and never had the small-pox, visiting a youth loaded with that disease, upon the bed-clothes being turned down in order to view his body, the intolerable smell obliged him to make a precipitate flight from his patient; he was soon after seized with small-pox of a bad kind, of which he died.

It does not therefore appear, that the retained perspirable matter, even though this circumstance was better ascertained, can be the cause of exciting the secondary fever; as the effect of retained perspiration in the state of the generality of patients under this disease, would operate as powerfully in bringing on fever, or increasing it when present, after 24 hours retention, as on Sydenham's 11th day.

Thirdly,

* Tom. ii. pag. 555.

Thirdly, We shall endeavour to point out the apparent origin of the secondary fever, in a consistency with the theory of the disease laid down before.

We have already observed, that the secondary fever is always connected with an extensive assimilation and a numerous crop of small-pox, of whatever kind they may be. In all of which cases, as we have shown; the whole of the assimilated fluids is not determined to the skin in the form of inflamed pimples ; that a considerable portion of them transude by the cutaneous pores, both by sensible and insensible perspiration ; and that nature commonly relieves herself of a part of these contagious matters, by the ptyalism, diarrhœa, urine, &c.

It seems, therefore, to be the existence of the same cause which at first excited the fever of eruption, and that supports, more or less, the same fever, after the eruption is completed in all the worst kinds of small-pox that gives rise to this fever, *viz.* an excess of contagious fluids still remaining in the system : For, though the most acrid and irritating part of the assimilated

milated fluids may probably be first propelled to the surface, as is the opinion of many good writers, and may contribute to moderate the fever and other symptoms, after the complete eruption of the pimples; yet the chief reason why there is not a perfect remission of fever at that period, as happens in the mild small-pox, is, that a considerable portion of contagious matters still remain in the blood, and produce the same effects; though in a lesser degree than what takes place in the stage preceding eruption; hence the continuance of fever during the suppurating period, though in general less violent than the eruptive fever.

While there is room for the contagious fluids to be deposited in the pustules, (and this always takes place, till they are stretched to their full extent), the fever keeps moderate; but about the 8th day of eruption, or Sydenham's 11th day, when the pustules are incapable of containing more, the contagious particles must be detained in the circulation; the consequence of which, is a considerable augmentation of fever, with a repetition and increase of

the whole train of symptoms which occurred before eruption, and this by all writers, is called the *secondary fever*.

There is another circumstance which occurs at this period, and appears likewise to have some share in accelerating the secondary fever, *viz.* either a slow discharge, or total interruption of the ptyalism, so large a quantity of the assimilated fluids having passed freely by this channel, during the preceding period of the disease; the stoppage of this discharge, in connection with the former, I consider to be the chief of causes of secondary fever.

The truth of this position, is corroborated from the proofs adduced, chap. v. of different quantities of the contagion being generated in different kinds of small-pox, and particularly from Mr Holwell's account of the eastern practice, where the clearest evidence is given of this fact. But however certainly the Bramins speak, of the method adopted by them, *viz.* by puncturing the ripe pustules, as the best means of avoiding the secondary fever, it must appear evident, as we have formerly observed, that the secondary fever is more effectually

effectually obviated, by diminishing the excess of the contagious fluids, during the course of the disease, and if possible from its commencement, than can be done by the acu-puncture, which supposes the suppuration to be somewhat advanced before the pustules are fit for puncturing; and before which period, in all the worst kinds of small-pox, many dire symptoms must have occurred, as the swelling of the head and face, ptyalism, delirium, and general tumefaction of the body, all of which are either moderated or prevented by promoting the intestinal discharge in an early period of the disease, which cannot be done by their method. This then affords a proof of the truth of our general theory, as well as of that respecting the secondary fever.

It may be asked, If the matter contained in the pustules, is not absorbed into the system, what becomes of it?

Answer. We have sufficient reason to believe, and that founded on evidence, that the matter in the pustules, especially after the 7th or 8th day, transudes by the cutaneous pores; this is evident from their

A a 2 change

change of colour, from their apices feeling rough and gritty like soft sand, owing to the transudation of their thinner parts, and from the morbid effluvia being far more perceptible at that period, than in the preceding stages of the disease.

It has indeed been supposed by the ingenious Mr Cruikshank, in his anatomy of the absorbing vessels, ‘ That all the parts of a living body are impervious, but by vessels, and that there is no transudation through the cuticle in life.’ In general I believe the truth of this remark; but it is a question, whether the cuticle of variolous pustules, stretched out to its utmost extent with matter, and separated from the cuticular vessels terminating in the epidermis, does possess life, after such separation. Mr John Hunter is of opinion, ‘ That it becomes dead by the variolous inflammation,’ which is highly probable: Be this as it will, we may be assured, the cuticle of each pustule, retains the minute openings where these vessels terminated, through which the variolous pus transudes.

We

We cannot have a more satisfactory evidence, that the pus in the pustules is not absorbed into the system, but that it transudes the pores, than by the application of the mask, directed for the prevention of pits, to be taken notice of afterwards. The common exsudation from the pustules, in all ordinary cases, is only discernible by the smell; but when this exsudation is prevented from evaporating into the common air, being intercepted by an unctuous mask, a measure which might naturally appear rather calculated to shut up the pores, and to favour the absorption of the pus; but in place of this, we daily find the mask overspread with the matter of the pustules, till they are perfectly emptied.

These observations respecting the probable source of the secondary fever, seems to be further illustrated by the consideration of those cases where variolous matter has been pent up in parts where it could not possibly transude the pores of the epidermis, and had apparently the same effect in favouring the absorption of the pus, (if such a process was possible in nature), with

the mask above mentioned. I am assisted in making this observation, by some cases of small-pox by accidental infection, related by Mr Quier of Jamaica, where fever, restlessness, and delirium, were excited by a collection of variolous matter, lodged between the cuticle and cutis of the soles of the feet, where from the thickness and hardness of the scarf-skin, there could be no transudation of the confined matter. But even in this case, Mr Quier very judiciously makes a distinction between the symptoms arising from this cause, and the secondary fever, viewing them as originating from irritation, and not from absorption, seeing the whole train of symptoms subsided, upon removing the cuticle and discharging the matter. But as the history is singular, I have given the relation of it in his own words: ‘ About the time of the incrustation of the pustules, I observed several negroes, on whom they were numerous, to be taken very suddenly with a severe fever, restlessness, and delirium. At first I mistook these symptoms for the usual secondary fever, and the patient in whom they occurred, died, as I believe, from

' from thence, before I discovered their cause. From some complaints these people uttered in their more lucid intervals, and from noticing their being remarkably affected, if any thing touched their feet, I was induced to examine them, and found the cuticle of their soles to be raised and distended with pus; for the matter formed by the suppuration of the pustules under this cuticle, which in negroes who go barefoot, is as thick as the sole of a shoe, not being able to get a vent, had separated it from the skin of the whole bottoms of the feet, and being there pent up, by irritating the extremely sensible naked papillæ of the skin, produced those symptoms; which after the cuticle of the soles of the feet were taken off, by the use of fomentations and soft dressings, were brought to subside without any difficulty *.'

I have already observed the superior advantages that attend the early purging course, in all cases of extensive assimilation over the acu-puncture of the Bramins, with

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* Letters and Essays, No. 2. p. 59, 60.

a view to obviate those dire symptoms, the swelling of the face, fauces, ptyalism, and secondary fever. But if the purging course has been omitted at the commencement of the disease, if the pustules are numerous, and all the symptoms violent, of whatever kind the small-pox is, as these appearances always indicate an excess of contagious fluids in the system, we have no other resource, than by attempting to carry them off by the intestinal canal, of which we have related some successful examples from Dr Freind on the secondary fever.

Though Sydenham considers the second fever to be always of the putrid kind, yet we find considerable variety in it. If the putrid symptoms formerly described prevail, we have no proper indication for bleeding, as he directs ; gentle purgatives, as the state of pulse and strength of the patient will admit, and at the same time supporting the vis vitæ, are to be chiefly depended upon for a cure. When from the state of the pulse, the age, history, and violence of the symptoms, we have reason to apprehend the presence of the phlogistic diathesis, bleeding may be of use, with the cooling

cooling regimen and laxatives ; and above all, attending to cleanliness; and the frequent admission of cold air to the patient.

In the secondary fever attending crystalline small-pox, to the sensible directions given by Dr Rogers, I have superadded one, with a view to solve a difficulty which that ingenious author starts, in respect to purging at this critical period ; and that is, when the generous regimen prescribed by him, has been attended with the effect of inducing a change upon the ichor in the pustules, disposing the pellucid lymph to a purulent appearance, we have then a certain indication of an alteration in the habit, which will admit of moderate purging.

Before I conclude this chapter, it will be necessary to mention an expedient that has been recommended by some authors of credit, both as a means of obviating the second fever, and of preventing pits, *viz.* *the excision of the ripe pustules,* or snipping them off with a pair of scissars, a very different operation from the acu-puncture of the Bramins, and cannot fail to be attended

tended with the worst consequences ; I shall only speak of it at present, as it refers to the first of these intentions.

The excision of the ripe pustules, is founded on the general idea of the secondary fever being induced by absorption of the variolous pus from the ripe pustules ; but if from what has been said, it appears that absorption of the pus is not the true cause of the secondary fever, then, by this practice, we do an essential injury to the patient, by depriving him of the cuticle, and augment the fever we wish to mitigate or prevent. By the acu-puncture of the Bramins, the empty vesicle becomes a receptacle for the contagious fluid still existing in the system ; but by snipping the pustules, we expose the tender cutis to the injuries of the air, by which we either seal up the mouths of the excretory ducts, and prevent a passage to the morbid fluids ; or in other kinds of the disease, we leave a number of weeping sores, which are extremely troublesome to the patient.

I should be apt to suspect from the ninth chapter of *Rhazis, de Arefactione Variolarum*, that he sometimes practised this expeditious

peditious way of emptying the pustules, by snipping them off, in place of puncturing them, as he seems to be much engaged in drying up the moisture from them, which if the disease is properly treated, I never saw the least occasion for. His words are,

‘ Oportet ut, si magnæ et numero plurimæ
‘ fuerint variolæ, deficcentur ; vel aqua il-
‘ larum excipiatur gossipio puro et mundo,
‘ in quo nihil omnino fit, quod possit ægro-
‘ tum lædere. Et fiant eo tempore suffitus
‘ ex foliis rosarum siccårum, vel foliis sty-
‘ racis arboris, vel santalo, vel foliis iridis,
‘ vel tamarici : et quidem rosæ in æstate
‘ sunt convenientiores, tamarix vero in
‘ hyeme.

‘ Variolæ quandoque nimia humiditate
‘ abundant. Id cum fit, jubito ægrotum
‘ dormire super rosis contritis, vel super
‘ farina oryzæ, aut farina seminum milii,
‘ in culcitram telæ rarioris texturæ infar-
‘ ta,’ &c. *

These directions shew what mischief may be done by improper applications, while we remain in the dark respecting the

* Rhaz. de Variol. &c. cap. non. p. 164.

the cause of symptoms. Rhazis, by suppressing the abounding moisture with styp-tic fumigations, &c. did effectually dam up the morbid fluids remaining in the system, which could not fail to hasten and augment the secondary fever, which by judicious management, might either have been greatly mitigated, or altogether prevented.

C H A P.

C H A P. XIV.

The Theory and Prevention of Pits.

After giving a general account of small-pox,

and the different ways of its removal, we

are now to consider the method of helping

In all bad cases of small-pox, where the pustules are numerous, and all the symptoms urgent, when a smart fever continues after the eruption is completed, and renders the prognosis uncertain, the preservation of life, is the physician's first and leading object; and if his labours are crowned with success, and there is a prospect of the patient's recovery, his next concern will be, to preserve the face, as much as possible, from deformity, more especially that of his fair patients.

I shall follow the same order in treating this last, though not least important part of small-pox, by observing the method I have taken in the preceding chapter; I shall shew the opinions, both of ancient and modern writers upon the subject; point out my objections to their different theories of pits, and then shew their true cause,

cause, the knowledge of which only can insure their prevention.

The *Arabians*, to whom we are indebted for the first accounts of the disease, as well as for the method of cure, are very particular in their directions, both for preventing and destroying the (*vestigia*) marks of the small-pox; the first is possible, and renders the other unnecessary, and therefore I shall only take notice of the directions given by *Rhazis*, with a view to prevent pits:

' Postquam perfecta est arefactio variolarum, et remanent in corpore squammæ et escharæ siccæ; inspice quænam harum sunt tenues, et siccitatis perfectæ, sub quibus nulla est humiditas; et iis instilla oleum sanguinum callidum, identidem, quoad molescant et excidant; nisi fuerint in facie: oportet enim illas curare cum oleo pistacino. Quæ autem ex iis escharis similes sunt, habentque aliquam magnitudinem; si videris iis subesse humiditatem, auferto eas excoriando, et præcidento caute, nullo oleo adhibito. Quod si loca, unde amovetæ sunt escharæ, non habeant

' habeant multum humiditatis; exsiccando
' sunt cum gossipio læve,' &c. *.

These directions, considering the period of time in which they were given, are better calculated for preventing marks occasioned by the small-pox, than any that have been since published. Rhazis, indeed, seldom assigns the reason of his practice; but the theory, both of the more ancient and modern writers on the cause of pits, has rendered all their attempts to prevent them ineffectual; of consequence, every part of the kingdom presents us with many living proofs, that as yet we have made no improvements in obviating this disagreeable effect of the disease.

Sydenham says little upon this subject; but the hints he has given, serve only to mislead the authors who follow him. He considers the branny scales which accompany the *confluent* small-pox, to be of such a corrosive nature, as to make deeper pits than the *distinct* commonly do. He anoints the dry scabs on the face with ol. amygd.

* Rhaz. de Variol. cap. decimum, p. 167.

amygd. with intention to ease pain and promote a more free exhalation of the hot effluvia; but, says he, I use no endeavours to prevent pitting of the face, as oils, liniments, &c., retard the scaling off of the crusts, &c.

Baron Van Swieten in his Commentary, has attempted to account for the cause of pits; and it would appear the generality of writers have adopted his sentiments. His words are, ‘ Omnes autem hæ foveæ fiunt, dum a pure, aut ichore, variolis contento, cutis ipsa eroditur. Quo igitur variolis contenta blandior est, eo minus deformitatis periculum est, et ob hanc causam a variolis discretis minor metus, quam a confluentibus. Præterea, quo magis variolæ extra cutis superficiem eminent, eo minus eroditur cutis; contra, dum variolæ planæ et sessiles sunt, in ipsa cutis substantia quasi hærentes, tunc longe plures relinquuntur foveæ. Sæpe, ut jam ante monui, observavi, quod mites, discretæ, et magnæ molis, variolæ postquam exsiccatae deciderant, reliquerint, loco fovearam, tubercula

'cula rubra, elevata quæ post aliquot sep-
 'timanas sensim sponte subsidebant, sicque
 'reddebatur cuti perfecta æquabilitas.
 'Aliquando contingit similes variolas licet
 'insigniter supra cutem emineant, tamen
 'et in profundum simul dimergi, satisque
 'profundas foveas, licet numero paucas,
 'in facie relinquere, consumpta per puris
 'copiae cutis substantia: semper tunc vi-
 'di, quod hæ pustulæ maturationis tem-
 'pore habuerint circa basin circulum ru-
 'brum, longe ampliorem, profundioris sup-
 'purationis indicium. Prodest tunc chi-
 'rurgicam, ut ulcus apertum: tunc enim
 'possimus, applicato oleum ovorum, vel
 'aliis similibus molissimis adhibetis, fun-
 'dum ulcusculi sic emolere et a rosione
 'puris defendere, ut vasa apta maneant ad
 'restitutionem perditæ, atque ita reple-
 'antur foveæ, vel longè minus profundæ
 'faltæ maneant *.

I consider the whole of this theory to be mere assertion without evidence, and without any solid foundation; and conse-

B b quently

* Ger. Van Swieten Comment. in Herm. Boerhaav. Aphor. vol. v. p. 137.

quently the practice established upon it, can neither answer the intention of the physician, nor be of the smallest benefit to the patient.

One of our first physiologists has lately published his thoughts upon this subject *, in an inquiry into the *true characteristic* of the small-pox. Whatever that may be, it is to be questioned, if some of the distinguishing characters of that disease are to be found in the *subject*, which laid the foundation of his ingenious paper and inquiry, viz. *a child undergoing the disease in the womb*. The pernicious effects of heat in this distemper, and the powerful influence which the application of cold air has upon it, must establish a material difference, both in the disease itself, and in some external circumstances attending it, in a subject of this kind, from one that has breathed the common air. For example, in a child born under small-pox, either of the contiguous or confluent kind, in the 7th, 8th, or 9th day of the eruption, we shall find the matured pustules uniformly

* Philosoph. Transact. vol. lxx. No. 8. p. 128.

uniformly the same over the face, body, and extremities; whereas Sydenham gives it as one characteristic of the disease, that from the 7th day, the pustules on the face turn of a yellowish or brown colour, and their apices become rough, and begin to harden; which effect, as will be shown, being occasioned by the influence of the common air, must always be wanting in the foetus. However mild, therefore, the fluids of an infant in the womb may be supposed, yet being shut up, as it were, in a close oven, under the influence of cutaneous inflammation and suppuration, and deprived of this salubrious element, it is noway surprising, that the generality of children, in this early period of their existence, sink under even a moderate eruption of small-pox.

This ingenious author considers 'the certain characteristic of small-pox, or 'that by which it differs from all other 'eruptions, to be the formation of a 'slough in every pustule, or a part becoming dead, by the variolous inflammation; that this slough is the cause of 'the pit, after all is cicatrized, and is a

' real loss of substance of the surface of
' the cutis: And in proportion to this
' slough, is the remaining depression: That
' the chicken-pock does not commonly pro-
' duce a slough, as there is no loss of sub-
' stance in this case, there can be no pit.
' But sometimes, tho' rarely, there is a pit
' in consequence of a chicken-pock, then
' ulceration has taken place on the sur-
' face of the cutis, a common thing in
' sores.'

Without entering further into the opinions of the learned upon this subject, which in general are founded upon *the acrimony of the pus, ulceration, and loss of substance*; I shall endeavour to show, that none of these are the cause of pits, and shall then point out what is their real cause, the truth of which is proved, from the success of the method used for their prevention.

1st, If we attend to the progress of small-pox by accidental infection, we must observe; that the matter in the pustules continues longer in a state of fluidity upon the body and extremities, than upon the face; they are frequently seen ten days

days in this state, after those on the face are perfectly dry and crusted. Hence, we are led to conclude, that if pits are occasioned by acrimony of the matter, they must be deepest upon those parts where the matter continues longest in a fluid state; but we seldom or never see a pit on the body or extremities.

2d, It is observable, that notwithstanding the variolous matter continues so long in a fluid state, on some parts of the body, covering innumerable nervous papillæ, terminating in the cutis, especially in the mild, and even in the contiguous small-pox; yet we never hear a patient complaining of pain, from such a number of small phlegmons, after the inflammatory state is over, a certain evidence the pus has no acrid quality. In these circumstances, did either erosion or ulceration take place, some degree of pain must necessarily ensue under every pustule; but by snipping off any of these matured pustules, with a pair of scissars, we have ocular demonstration, there is neither ulceration, nor loss of substance, on the

surface of the cutis. Pits, then, do not originate from erosion, ulceration, or loss of substance. In the supposition that every pit is occasioned by a real loss of substance of the surface of the cutis, which must always be accompanied with ulceration, how do we account for each of these ulcuscula healing up, and cicatrizing nearly at the same time, as we see they do, whenever the pustules are broken, or the crusts fall off?

As pits, therefore, neither originate from acrimony, ulceration, nor loss of substance ; we shall endeavour to point out their *true cause*, the knowledge of which is essentially necessary to their *prevention*.

Every one knows the face is the only seat of pits in consequence of small-pox ; and our ingenuity in attempting to obviate this disagreeable effect of the disease, is solely employed in guarding this part ; a pit or two may occasionally occur in other places, but these we pay no regard to. The obvious reason why the face is more liable to be pitted, than any other part of the body, is its exposure to the common air. About the seventh day of eruption,

eruption, sometimes sooner, according to the kind of small-pox, the apices of the pustules on the face change colour, feel rough, and begin to harden; which appearance first takes place about the mouth and chin, possibly from these parts being more chaffed with the bed-clothes, &c. This discoloration spreads over the whole pustules of the face, and may be felt with the finger, crusty and hard on their tops, which hardness gradually increases downwards in the pustules, till the whole matter in each is condensed into a solid crust or scab.

It is the density of these pustules impressing the tender and elevated cutis, now thickened considerably by the swelling of the face, that forms what we commonly call *pits*, but more properly *impressions*, a term which leads directly to their true cause, viz. *the pressure of these condensated pustules upon the tender cutis*, producing the same effect, as that of a seal impressing melted wax.

That the integuments of the face, in this period of the disease, are in a state fitted to receive such *impression*, is evident,

from the general tumefaction of this part, which cannot fail to render it more susceptible of impression, than in its natural state : Impressions take place, where no swelling occurs ; but they are not so deep, and are sooner obliterated by time ; any solid body, such as a pea, being laid on the skin, and a moderate degree of pressure applied to it, will form a depression, which will remain some time, even after the pea is removed ; but sooner or later the elasticity of the fibres will prevail, and the skin recover its usual smooth surface ; but it is never altogether so with the impression made upon the thickened and diseased cutis. In general, the depth of the impression depends upon the degree of tumefaction, as well as the size and density of the pustules.

The truth of this theory is confirmed by ocular demonstration ; by examining the pits in persons deeply marked, within a few weeks of the scabs falling off, a good glass will discover a variety of impression stamped on their bottoms ; could this be induced by any other means, than from the bases of the condensated pustules ?

pustules? Or, if one of these large hardened pustules is separated from the old cuticle to which it adheres, while a small degree of moisture remains at the base, it will make the same impression upon melted wax, if not too hot, that is to be found at the base of the pit from whence it was taken; but this experiment can only take place where the condensated pustule is large, and its base unequal or irregular in its surface; in many hardened pustules, their bases are perfectly smooth, and, as it were, polished.

Having attempted to explain the true cause of pits, or impressions, in consequence of small-pox, I shall now proceed to the method I have hitherto used for preventing them; and the success that has attended this mode of treatment, in the course of several years practice, establishes, beyond a doubt, the truth of the theory upon which it is built.

As the condensation of the matured pustules upon the face appears to be solely owing to the influence of the external air, my first intention is, to prevent the access of air to the part. This is done,
by

by the application of a *mask*, composed of old fine cambrick, thinly spread with the following liniment :

R. Ol. olivar. opt. unc. iv.

Spermat. ceti.

Ceræ alb. utr. semunciam.

Liquescant simul leni igne et agitentur donec refixerint.

I first apply a triangular piece of cambrick, spread with the liniment over the nose, which is not intended to shut up the nostrils, but snipped in different parts at its base, and these snips a little turned up within the nostrils : A suitable opening is cut in the mask, to admit the nose already covered, and another opening for the mouth, a little snipped, for its better application upon the lips, though it is unnecessary and inconvenient to bring it too far within the lips. The mask is spread with the liniment in the same way, as the triangular piece for the nose, and is kept on with tapes, or narrow ribbon, that fasten behind ; its circumference reaches to the hair on the forehead and temples, covers

covers the cheeks, and turns under the chin, being snipped at the bottom for that purpose.

If the above description is not readily understood, the intention of it being merely to exclude the access of the external air from the face; this end may be obtained, by covering the whole face with separate pieces of old fine cambrick; spread over with the liniment, leaving apertures for the mouth and nostrils.

I generally begin to apply the mask some part of the seventh day, or immediately upon observing a change of colour in the pustules of the face.

The mask ought to be renewed three or four times in 24 hours, as the heat of the face soon consumes the liniment that is spread upon it. The patient never opposes a new dressing, after having once experienced its agreeable effects, as it remarkably cools and refreshes the face, especially for some time after it is first applied, which has led me in some cases to apply it every four hours. In removing the mask, let the face be gently touched with

a soft cambrick handkerchief, and exposed for as short a time to the air, as possible.

Under the mask, which, in itself, is transparent, we are able to view the state of the pustules distinctly every day : And as this application effectually precludes the admission of the common air, we shall find the variolous matter in the pustules preserved in a state of fluidity, as long as they remain so upon other parts of the body, or until they gradually empty themselves.

The mask is to be continued, till the pustules are perfectly emptied, which happens in the course of ten, twelve, or fifteen days, and in some kinds of small-pox, more ; my general method is, when the pustules are emptied, to remove it an hour of a day at first, and gradually to increase this period. As the swelling of the face comes down, and the eye-lids begin to open, apertures may be made in the mask for them ; but it is of much importance to the patient, that his eyes are brought to the light, in a very gradual manner.

In the preceding chapter, we endeavoured to prove, that the secondary fever did not originate from absorption of the variolous pus from the pustules, and, p. 371. started a question, that if the pus in the pustules was not absorbed, what becomes of it? We there observed, that it transudes by the pores of the pustules, of the certainty of which we have the most satisfying evidence in using the mask.

Every person who is pleased to make trial of the mask, will have ocular demonstration of the above fact; for, no sooner are the pustules stretched to their full extent, and the matter prevented either from hardening, or from evaporating into the common atmosphere, by means of the unctuous mask, than we find at every dressing, each pustule bedewed with pus, by which they gradually lessen in size, and become more and more flaccid; a circumstance which could not have been brought to light, but by the use of the mask; and which constant exudation from the pustule, renders it necessary to shift the mask often, and gently to wipe the pustules, as before mentioned. The
same

same exfudation takes place for a day or two, on the pustules of the face, where the mask is not used, as appears from that roughness which we feel on their tops, the seventh and eighth day of eruption; but from that time, the condensation of the pustules advances so rapidly, there can be no more exfudation.

The argument then, from this fact, superadded to what has been adduced in the preceding chapter, is highly satisfying and conclusive: For, if we daily perceive an exfudation of pus through the pores of the ripe pustules on the face, notwithstanding the application of the unctuous mask, have we not more reason to admit the transudation of the matter from the pustules of the body and extremities, than adopt the common, but unphilosophic notion, of its being absorbed into the system of circulating fluids?

In the application of this theory of pits to practice, in the varieties of small-pox, that have come under my care, I have constantly found the above mode of treatment to answer my highest expectation, not only in preventing pits in the worst cases

cases of this disease; but must observe an agreeable and unexpected effect, which I have constantly found to accompany it, *viz.* a preservation of the natural features. Many have experienced such an alteration in the countenance of their friends and children, from the effects of this disease, that they could scarcely know them again. This disagreeable effect has been completely prevented, in every case that I have met with, by the method above directed.

But that I may not be thought to ascribe too much to the use of the mask, I must observe, that the success of this application stands connected with the mode of practice recommended in the preceding part of this work, by which the inflammatory symptoms are duly attended to, and the excess of the contagious fluids, (the active and irritating cause of every symptom that occurs in this disease), is seasonably and gradually evacuated, by which the whole train of symptoms are moderated, particularly the tumefaction of the head, face, and fauces, as well as the second fever.

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The use of the mask has therefore been rendered more successful in preventing impressions, and preserving the natural features, by carrying it on in connection with the general method of cure laid down, for obviating the excessive swelling of the head, face, &c.

I shall now answer some objections that may be made to the preceding theory of pits, and to the practice founded upon it.

Objection 1. As some kinds of small-pox leave fewer or more superficial marks than others, perhaps the cases under your care were of this sort, and therefore you might be deceived, by ascribing the want of *impressions* to the method in which they were treated.

Answer. If my theory of the cause of pits is just, and consonant to reason and experience, the effects must be correspondent. If every impression is occasioned by induration of the pustule, and if, by observing the above method, the induration of the pustules is prevented, it is impossible that any impression can take place.

place. I was aware of this objection, and formed it early to my own practice, and was fully resolved concerning it, by the following simple experiment. In particular cases, I have exposed one or two pustules, and suffered them to harden on the temple near the hair, a place where the mark would be least perceptible, which produced impressions, when the whole face covered with the mask, was perfectly smooth, and unmarked.

Objection 2. An application of this unctuous nature to the face, in such a critical period of the disease, may be attended with bad consequences, depriving the patient of the benefit of cool air to this part, which has been universally useful, in every stage of the disease: And by shutting up the cutaneous pores, may hasten (in the opinion of some) the absorption of the variolous matter, and accelerate the second fever.

Answer. The application of cool air in every period of this disease, is of the greatest importance to the sick; though it is not so much the influence of the ex-

ternal air applied to the surface of the body, which also has its use, as receiving into the lungs, fresh, cool, elastic air, in place of the foul infectious air of the apartment where the sick lies; and this is not prevented by the mask.

I have paid particular attention to the state of the pulse, and progress of the other symptoms, from the time the mask was first applied, but never observed increase of fever, or other hurtful consequences from it. On the contrary, the patient always expressed much pleasure in the application, was greatly refreshed by it, and wished it oftener renewed than was necessary.

The last part of this objection, I have formerly answered, by showing, that in using the mask, instead of forwarding absorption, there is a visible transudation of the matter contained in the pustules through their cutaneous pores.

Objection 3. Since the practice of inoculation has more generally prevailed, there is little occasion for the use of this method,

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as few comparatively are pitted in this way of communicating the disease.

Answer. I admit the truth of the objection in general, at the same time it must be allowed, there are many instances both of children and adults, that have been pitted by inoculated small-pox. In every kind of this disease, where suppuration in the pustules takes place, if not preserved from the influence of the air, they must necessarily harden, and impress the tender cutis. But every one knows, the practice of inoculation is far from being general. The constant annual mortality from small-pox, shows, that thousands of^t the worst kinds at all times prevail, and consequently, that thousands stand in need of the method proposed.

Although during many years practice, I have always found the mask to answer my intentions, I must however acknowledge, that in several cases, when I was not called in an early period of the disease, and where, from the severity of the symptoms, I despaired of life, I never attempted to use it. In cases therefore of a

numerous eruption, whether of the contiguous, confluent, putrid, or crystalline sort, where little remission of fever has taken place after the completion of the eruption, where general tumefaction of the head, face, and body occurs, and no diarrhœa takes place, nor any method employed in an early stage of the disease, to reduce the excess of the contagious fluids, by diverting them into another channel; in such cases, the prognosis being unfavourable, if not desperate, I have always considered it as unnecessary to apply the mask.

I beg leave to observe upon this head, that not only the theoretical part of physic, but the practice of that useful art, has been greatly retarded in its progress, by a blind veneration for great names, whose different hypotheses have been greedily adopted, without searching them to the bottom, both for our own satisfaction, and more certain guide in practice. *Van Swieten* in general follows *Boerhaave* in his opinions, and though both men of eminence in the profession, who have contributed much to the improvement of the healing art; yet, would it not be a prodigy,

digy, if the voluminous writings of these authors were wholly exempted from mistakes; and what private practitioner would venture to strike out against the opinions of men of such established characters? But as it must tend more to the benefit of mankind, as well as the advancement of science, to establish our theory of diseases upon facts, which only can ensure a successful practice; this ought constantly to be aimed at, though we differ in opinion from great and leading names.

If this observation is allowed to be just, and conducive to the public interest, I must take the liberty of reversing every part of the doctrine on the cause of pits, transcribed from Van Swieten's Commentary, (page 322, 323), and to aver, that pits are not occasioned by the pus or ichor corroding the skin, and forming ulcers. That, in general, the mildest pus produces the deepest impressions, because it is the most perfect, of a better consistence, and condensates more firmly; whereas pus contained in small-pox of the confluent kind, is thinner in consistence, never hardens so firmly, and of course, cannot impress so

deeply. The flat pustules which he describes, and suspects to make the deepest marks, do not require to be treated chirurgically, supposing them to occasion deeper ulcerations, it having been shewn there is no ulceration under any of them, but in certain circumstances ; nor can the oil of eggs be of the least use in repairing the loss of substance, because no substance is lost.

Had not Van Swieten been greatly prejudiced in favour of the common theory of pits being occasioned by acrimony, ulceration, and loss of substance, his own particular case, when under the small-pox, if he had properly attended to it, might have convinced him, why one part of his face was pitted, and another deprived of the scabs, perfectly smooth ; but as I may be prejudiced on this point, shall transcribe his own words :

‘ Cum ergo a resorpto pure tot et tanta
 ‘ metuenda sint mala, antiquissimi medici,
 ‘ Arabes, qui de hoc morbo scripserunt, il-
 ‘ lud jam commendaverint, celebres multi
 ‘ medici, adhuc hodie in illa opinione sint,
 ‘ tuto

tuto et cum fructu hoc fieri posse *, pul-
cherque effectus observetur, dum crustæ
crassæ, sub quibus ichor putridus vario-
larum confluentium collectus hæret, dis-
cinduntur, facile eandem ego amplector
sententiam, et quidem tanto magis, cum
in me ipso viderim, non ideo faciem de-
turpari, quia pure collecto paratur exitus.
Probe enim memini, quod, dum nume-
rosis variolis, quæ faciem occubant, ex-
siccari incipientibus, totus nasus densa
crusta tegeretur, sub qua pus collectum
hærebat, curam mei gerens custos, usu
ut agebat, edoctus, me nil minus expec-
tanti, iictu digiti totum hoc operculum ex-
cufferit, crudum locum leviter abstersum
molli emplastro texerit, atque indignan-
tem me pacaverit, promittens, nullam de-
formitatem inde metuendam esse. Even-
tus probavit asserti fidem: nam vix una
vel altera foveola, finito morbo, in naso
apparuit, cum reliqua faciei pars pluri-
mas haberet, sed non admodum profun-
das, quæ sensim per ætatem deletæ sunt

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* Hillary of the Small-pox, p. 151.

Wintringham Comment. Nosolog. p. 65.

' eo usque, ut vix appareant, nisi attente et
 ' cominus intuente. Laboraveram enim
 ' variolis, numerosis quidem; sed discretis,
 ' et quæ multum eminebant supra cutis su-
 ' perficiem; hoc autem observavi frequen-
 ' tissimè, quod elevatæ et majores variolæ
 ' longe pauciores et minus profundas foveæ
 ' in cute relinquunt, quam planæ et sessi-
 ' les, quæ minus super cutem eminent, sed
 ' profundius in ipsam quasi cutis substan-
 ' tiæ demerguntur, quam suppurando
 ' consumunt *.'

If according to the theory of pits taken notice of, page 386. and seq. there is a *slough* in every *pustule*, and this *slough* is the cause of the *pit*; then pits, (supposed by that author to be always accompanied with loss of substance), must take place under every pustule, which seldom or never occurs on the body and extremities.

Whatever appearance the small-pox may have on an infant, born under the disease, if the doctrine advanced above is just, there can be no induration of the suppurated

* Ger. Van Swieten Comment. in H. Boerhaav. Aphor. vol. v. p. 121, 122.

rated pustules in such a subject, as the common air has no access to it; hence if a child undergoes the small-pox in the womb, and survives the disease, it is impossible the face can be pitted; the marks, therefore, which some authors speak of, as visible on new born children who have passed through the disease a short time before birth, cannot be *impressions*, but merely a discoloration of the skin, in consequence of the preceding inflammation, and a new cuticle under each pustule; an effect which daily occurs, both in children and adults, who have recently undergone the disease, which marks continue visible for several weeks after, whether pitted with the small-pox or not.

C H A P.

C H A P. XV.

Of Ulcerations in consequence of Small-pox.

HAVING shown that pits are not occasioned by ulceration, or loss of substance, but solely by the *impression* of the condensed pustules upon the thickened cutis, I shall make a few remarks on ulcerations in consequence of small-pox, which will more directly point out the distinction between *these* and *pits*.

Ulcerations happen more frequently in cases of the confluent small-pox, than any of the other kinds; and it is surprising, that such as view pits to arise from erosion and loss of substance, are not sensible of the mistake, by observing the essential difference between them. We find every pit found at the bottom, as soon as the scab falls off; whereas ulcerations have a very different appearance, as they always penetrate the cutis, and often insinuate into the cellular membrane, are tedious in healing,

healing, and without great attention, productive of an irregular scar; besides which distinctions, they more seldom happen on the face, than other parts.

The general cause of ulcerations from small-pox, is the acrimony of the variolous pus; not that acrimony is a quality peculiar to variolous matter in general, as we evidently see both in the *distinct*, and even in the *contiguous* kinds, how long the matter contained in the pustules of each, remains in a state of fluidity, covering the sensible cutis, without irritation or pain. But in particular habits, we find the variolous matter much thinner than in others, and in place of being collected in distinct acuminate pustules, diffusing itself under the cuticle in a large and irregular surface. This spreading of the variolous pus into large blotches, as it characterises the *confluent* small-pox, is a certain indication of some degree of acrimony, the most simple effect of which, upon removing the cuticle from any of these clusters, or conflues, has the appearance of inflammation or excoriation, is attended with itching,

and

and sometimes pain, and heals in the course of a few days.

But in confluent small-pox, we meet with ulcerations more deeply seated, *viz.* when a chain of clusters happen upon any particular part, and communicate with each other, we frequently find a real ulceration, attended with loss of substance, under the most dependent cluster; which ulceration, may be prevented, if seasonably noticed by the attentive surgeon, by opening the most dependent cluster with a lancet, which soon empties the whole chain. If these happen not to be observed before the 8th or 9th day of the eruption, by penetrating the cutis, and membrana cellulosæ, they prove extremely troublesome and tedious in healing, having sometimes seen them continue open, and discharging a thin saries four or five weeks after the patient's perfect recovery from the small-pox ; the effect of which, is not a pit, but an ugly and unequal rising above the surface of the skin. There are few ulcerations, however, in consequence of small-pox, if the part admits of proper compression, that leave any observable mark, which

which shews an essential difference between *pits* and *ulcerations*.

A beautiful young lady, under a large crop of confluent small-pox, while using the mask, had a range of clusters or conflues, reaching from the middle of her forehead to the tip of her nose; it did not appear to me, that these clusters communicated with each other, as in changing the mask from time to time, there appeared to be matter in each cluster, and no evident communication between them; but after the complete transfudation of the variolous pus, which left her face perfectly smooth, and her features unaltered, a deep ulceration appeared on the tip of the nose. This was dressed every day with great attention, and there was much difficulty in suppressing a fungus that daily got up; it was however healed in the course of a few weeks; it left no pit or impression, but a small scar scarcely discernible.

Ulcerations in consequence of small-pox, are to be treated as other ulcers; they are to be kept clean; the fungous granulations that sprout up from the bottom, to be gently repressed, with bandage, dry dressings,

sings, or mild escharotics, and to be cicatrized in the usual way.

Another cause of ulceration and ugly scars in this disease, is when children are not properly watched ; from the great degree of itching which attend some small-pox, they are apt to scratch and tear their faces, and even to go so deep with their nails, as to occasion considerable laceration, inflammation, and loss of substance ; these are to be treated as other lacerated wounds : Accidents of this nature, are sometimes prevented by the use of the mask, and the heat and itching of the part moderated by the antiphlogistic opening course.

There is one very disagreeable effect that attend lacerations, as well as ulcers in the small-pox, a kind of warty and insensible substance rising above the surface of the skin, in various forms, and sometimes contracting the parts, resembling the irregular cicatrix of a large wound ; this is one of the greatest deformities that happens in consequence of small-pox, and is not to be remedied, but in its infancy.

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This callosity whatever form it assumes, seems to spring from the wounded or lacerated cuticle, or the vessels which nourish that covering, its substance appearing to be of the same nature, and frequently happens in cases of tedious ulceration or laceration, where the cuticle oozes out a fluid peculiar to itself, for the purpose of restoring a covering to the exposed cutis, which not being properly repressed, is collected and thickened about the edges of the ruptured cuticle, in a variety of forms, and appears to be a substance of the same nature with that which forms a cicatrix upon the surface of large wounds. In the first appearance of this callosity, it may be repressed before it acquires too great a degree of firmness, by drying applications, dry dressings with bandage. It may be pared from time to time, if it rises much above the surface, and in some cases kept down with mild escharotics, which ought more especially to be attended to, as the ulceration fills up, endeavouring to keep a smooth and equal surface.

C H A P.

C H A P. XVI.

*Advantages arising from the preceding Mode
of treating the worst Kinds of Small-pox.*

I. THE first obvious advantage arising from the antiphlogistic and evacuant plan of cure, when early employed, is a moderation of the eruptive fever, and of all the dire symptoms, which attend that important period of the disease. The relaxation induced upon the arterial system, by venesection, proportioned to the age, habit, and violence of the symptoms, is of the greatest consequence in this early stage, as it has the most powerful influence in moderating all the subsequent symptoms that occur in the progress of the disease. It is certain, however, that bleeding of itself, will not accomplish this end, even though we superadd to it cold air, and carry the cool regimen to its utmost extent; it is not only necessary to remove

remove the stricture upon the heart and arteries, excited by the stimulus of a large quantity of contagious matters floating in the blood; but it is equally necessary, that this exciting cause should be as speedily removed, as the strength of the patient and other circumstances will admit; and this is both easily and safely effected, by a determination of the morbid humours to the intestines, an operation that can only be carried on in a gradual way; and though in violent cases, the good effects of it may not be immediately perceived; yet for most part, a mitigation of cephalalgia, delirium, restlessness, and other distressing symptoms, sooner or later, becomes apparent; and, by an early attention to this course, we generally obtain a quicker eruption of the pimplies.

2. The tendency of the morbid fluids to the head, has been remarked as an early symptom in all the worst kinds of small-pox; and every person of observation must know, that by means of the increasing size and weight of the head,

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and the perpetual salivation in consequence thereof, what a source of distress this symptom commonly proves, during the whole course of the disease, as it is with much difficulty the patient can raise his head from the pillow, or swallow a little of any liquid, which the parched state of his body so much requires. From this symptom likewise, cephalalgia, delirium, restlessness, anxiety, and watchfulness, are greatly increased; and the frequent termination of it in the course of eight or nine days from the eruption, is death, at least, I may venture to say, to more than one half of those in whom this symptom rises to any considerable degree, from reasons formerly mentioned. Sydenham indeed asserts, that in small-pox of the confluent kind, this symptom is as *necessary* as the pustules themselves; but what makes it necessary, or essential to the disease, seeing it neither completely removes the cause, is a source of aggravating many symptoms, and frequently the immediate occasion of death? It does indeed become a symptom of consequence, when from its first appearance, the physician patiently looks on as a spectator

tator of nature's work, and makes no attempt to rescue so material a part from the ravages of a violent disease. It is therefore of the greatest importance in the cure of bad small-pox, to obviate this symptom from its first appearance, by counteracting the usual determination of the contagious fluids to the head, and diverting them to the intestines, which can be effected with the greatest safety, and the most desirable success, in every inflammatory case where the pulse keeps firm and strong; and may also be attempted in cases of debility, when done with caution, and the vis vitæ at the same time properly supported.

The not attending to this symptom in the commencement of the disease, before the fluids have contracted a course towards the head, and suffering them to run in this channel, till the swelling extends itself to a monstrous size, even upon the supposition that the patient weathers the storm of the 11th or 12th day, yet from the great distension of the face, he is deprived of all that benefit from the use of the mask, which constantly takes place when the

swelling is kept moderate; for though the mask in every case, will effectually prevent the induration of the pustules, by preserving the pus in a state of fluidity, and of consequence, the skin of the face will be left smooth, and without the least impression; yet from the great and continued extension of the muscles, and integuments of that part, some alteration of the features will unavoidably take place; upon which account, as I observed in the xivth chapter, there is a strict connection between the use of the mask, and the method of cure recommended in the preceding pages.

3d, The third great advantage obtained by the antiphlogistic and evacuant course, is the mitigation, if not the absolute prevention of the secondary fever. In the common course of practice, as it is at present carried on, according to Sydenham's plan of cure, if the patient, through strength of constitution, or the fortunate intervention of diarrhoea, escapes the ordinary fate of multitudes on the 11th or 12th day, the second fever commences, and

and for most part, puts a period to the dismal catastrophe. The prevention of this fever, which is no more a necessary symptom, than the tumefaction of the head, face, and fauces, but merely arising from an excess of contagious matters detained in the system, having neither access into the full pustules, nor into the obstructed salivary ducts. The prevention therefore of this symptom, is of the greatest importance to the preservation of life, and can only be effected by an early reduction of the proximate cause. That it has either been wholly prevented, or greatly moderated by the above method, is evident from several examples adduced in the cases before related, which affords no incon siderable proof of the truth of the theory, upon which the practice is established.

4th, As the leading object of this mode of cure, by the prevention of the most dangerous symptoms, is the preservation of many valuable lives to the state; so I may truly say, that in a great measure it shortens a loathsome disease. It is well known in the experience of most practitioners,

that many patients labouring under bad cases of small-pox, have not only survived Sydenham's 11th day, but continued under the severity of a secondary fever for ten days longer, and some have lingered for 30 or 40 days ; the situation of such is truly pitiable, either in the event of life or death. We may easily conceive the effects of a continued state of fever, from its first commencement till the termination of a tedious secondary fever ; what a degree of debility, as well as putrefcency must be induced upon the system ; and though we are told of a few almost miraculous recoveries under such circumstances, yet the constitution of the strongest, is hereby so much shattered, the blood impoverished, and the strength so greatly impaired, that such persons either become hectic from affections of the breast, or fall into oedematous swellings and dropfy. Although cases of this kind do but rarely occur, in comparison with those of the very acute and violent kinds ; yet it must be a peculiar happiness both to the patient, as well as his attendants, to have a disease of this nature as much shortened as possible ;

fible ; and I know no method better calculated for promoting this end, than the mode of practice recommended in the preceding sheets.

5th, There are some other special advantages attained by pursuing the above method of cure, in the prevention of some dangerous and often mortal symptoms, as well as of some disagreeable deformities, and irreparable losses that frequently occur in the common mode of treating the small-pox. We have already observed the aptitude of the unrestrained contagious fluids to fly to the head, and have remarked, that in consequence of topical inflammation in that part, both phrenitis and suppurations of the meninges of the brain, have frequently taken place ; that in some cases, pus has been discharged by the ears, and in others upon dissection, a collection of matter found upon the brain. From the observations laid before the public, I hope it will appear, that the early antiphlogistic and evacuant course, will prove the most effectual preventive against the occurrence of these dire symptoms,

toms, which for most part terminate fatally.

Among the deformities occasioned in consequence of small-pox, that common one which occurs in every bad case where the patient survives the disease, by which many of our finest faces are so materially injured; this disagreeable effect of the disease, is by the mode of treatment inculcated, in connection with the use of the mask, most effectually prevented. But there is a deformity that occurs in consequence of this disease, attended with material prejudice, which is generally incurable, I mean the loss of vision. It is scarce possible to walk the streets of any populous city, without meeting numbers under this irreparable affliction; and though many are deprived of that invaluable blessing from other causes, it will be found the far greater number suffer this deplorable loss, in consequence of small-pox. The poor in general are much exposed to this misfortune, by which being incapable of supporting themselves, are either reduced to the state of beggars, or become burdens on society; but this is also

also an event that takes place in different degrees of higher life, who have the advantage of the best medical assistance; as the mode of treatment recommended in all those cases of small-pox, from whence the mortality arises, is merely calculated for the prevention of the worst and most dangerous symptoms, the author flatters himself, it will also be effectual in preserving the sight, that blessing which gives a relish to every other enjoyment of life.

We cannot conclude this subject, without making a few observations on the state of the poor, the local situation of the far greater number of which, is highly unfavourable to variolous contagion when it occurs, and serves greatly to increase the mortality of that disease.

In every part of this work, I have insisted at great length on the signal advantages of the cool regimen in every case of small-pox attended with symptoms of inflammation, and of the great benefit of cold air, and roomy apartments, in every species and stage of the disease; but it must appear obvious to every intelligent reader, that whatever good effects may result

result from the cool regimen, cold air, and spacious chambers, the local situation of numberless individuals, excludes them from these advantages. The poor form a great proportion of the nation; I do not mean the begging poor, nor such as are comprehended in alms houses, but the common labourers of all occupations, the vast numbers which possess the environs, and narrow lanes of all great cities and populous towns, the peasantry in general; these from their indigence, their low, damp, and ill aired houses, and frequently from great numbers being crowded into small apartments, and destitute of the means of cleanliness, suffer greatly in a small-pox season.

I have indeed observed, that the cool regimen of itself, though carried to its utmost extent, can have no direct influence in removing the immediate cause of the disease; yet, as we formerly hinted, the cool regimen answers a material end in the cure of small-pox, *viz.* its general tendency to check the progress of assimilation, which of itself, when the contagious particles

particles are daily suffered to accumulate, would overcome every ordinary intention of cure.

If the cool regimen, the large and well ventilated chamber, with the frequent application of cold air, have a tendency to check the assimilating process in the fluids, how greatly must that process be promoted by an opposite course? This is evident from what may be observed in the most benign small-pox; for by the application of a temporary heat to any particular part, during the period of eruption, we can forward the assimilation, and of course increase the number of pimples in that part. But heat is not only pernicious in every kind of small-pox; but breathing in a close, confined, and impure air, must be attended with the most destructive consequences, when variolous contagion at any time prevails, as a situation of this kind, in general, propagates a bad disease, in which the rapidity of the assimilation, overcomes every effort to counteract it, and renders the prognosis in every such case desperate.

Besides the local disadvantages of the poor, it is well known, when sickness of any

any kind occurs in their families, they are no friends to early medical assistance, the proper season when the preventive plan of cure can be most successfully employed; hence matters come to an extremity before they seek advice, when little or nothing can be done for their relief.

The habitations of the poor, joined to the many inconveniences they labour under, render the small-pox doubly hazardous to this useful class of people. Humanity therefore, as well as sound policy, claim the attention and exertion of the public in their behalf; they can receive little or no benefit from the best medical advice, while confined to their own houses; and therefore, if we would wish to reduce the annual mortality among this necessary part of the community, every city and great town in Britain, ought to have one house or more, appropriated for the reception of variolous patients, or a large empty ward in any of the hospitals. This expedient would not only prove a certain means of preserving many useful lives to the state, but the best security against the spreading of infection. The annual expence attending

ding such an *asylum* for small-pox patients, when properly regulated, would be trifling to any community, compared with the public and national advantages resulting from such an institution, and might be easily supported, either by a voluntary subscription, or otherwise.

Hospitals of this kind may be more easily erected, than their intention carried into execution, through the mistaken prejudices of the poor themselves, who, for a time, may be averse to the sending of their children into houses of this kind for cure, especially at their commencement ; it will not be easy to convince them of the advantages of such an institution, though the preservation of the lives of their families depend upon it. Time, however, which brings most things to maturity, and often accomplishes seemingly greater difficulties, and the experience of the salutary effects of such institutions, will gradually overcome the prejudices of the poor, and self-interest will induce them to avail themselves of a charity attended with so much public and private utility.

A N
A P P E N D I X,

REPRESENTING THE

PRESENT STATE OF SMALL-POX,

WITH REMARKS ON ITS

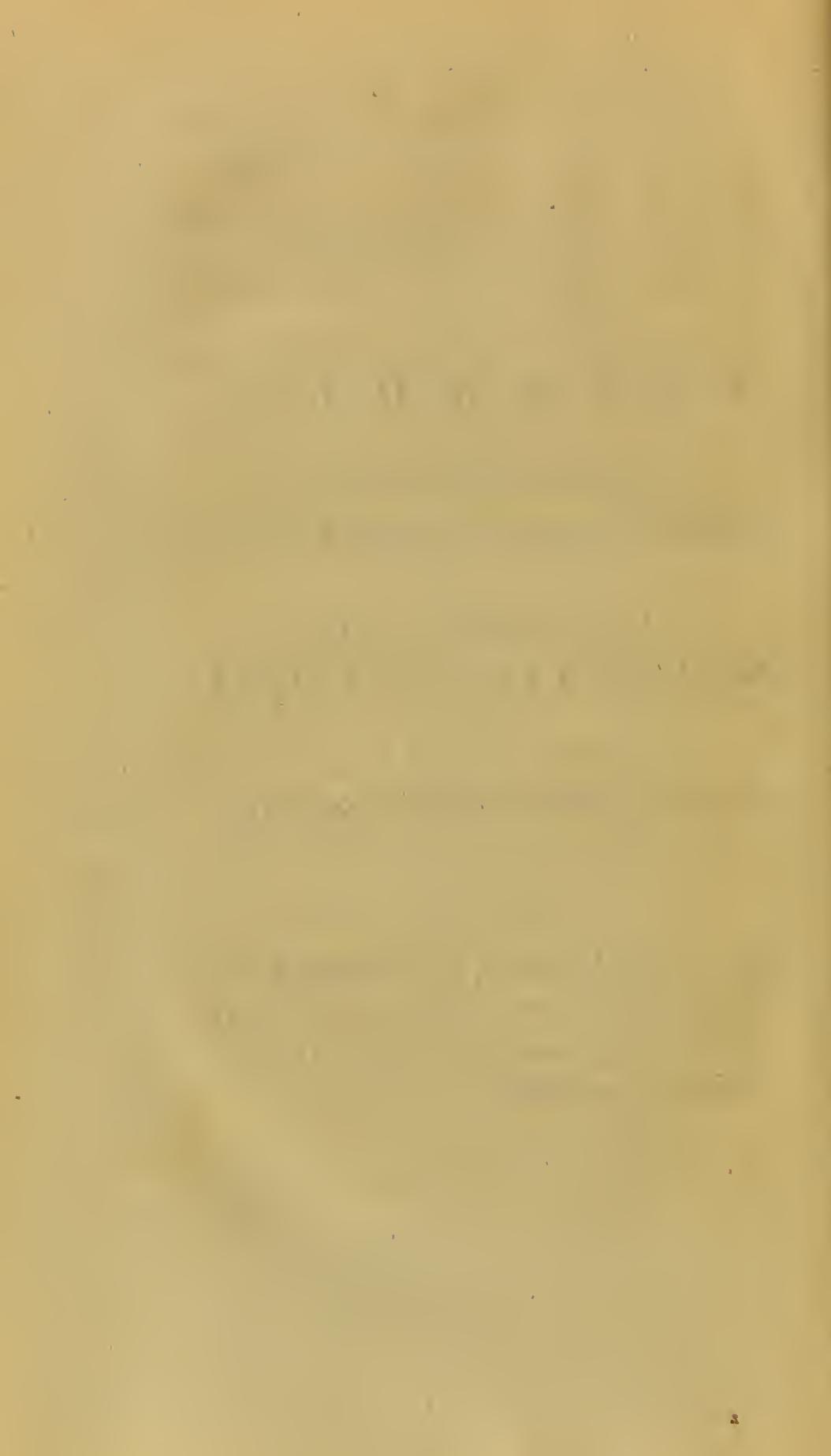
FREQUENCY AND MORTALITY,

AND ON THE

EXPEDIENTS USED FOR REDUCING THESE.

FROM A

VIEW OF THE CAUSES OF ITS FREQUENCY AND
MORTALITY IN THE PRESENT DAY, SOME
MEANS ARE PROPOSED, OF STILL FURTHER
REDUCING THE NUMBER OF DEATHS.



A P P E N D I X,

Representing the present State of Small-pox, &c.

HAVING, in the preceding inquiry, laid before the public, a mode of cure, calculated not only for alleviating one of the greatest calamities to which mankind are exposed, but for reducing the constant annual mortality which attends the worst kinds of small-pox ; I propose to conclude this work, by inquiring whether a still greater number of lives may not be preserved to the state, by considering other sources from whence the general mortality arises, besides that great one originating from what is called the *natural distemper*.

It has already been observed, that the local situation, and other disadvantages which the poor in general labour under, deprives them of the benefits arising from the method of cure recommended, either for obviating, or even for alleviating those dire symptoms of the disease, which so

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frequently terminate fatally : Hence the reduction of deaths arising from this particular source of mortality, cannot be so extensive or complete, as could be wished. The author, however, is persuaded, that many thousand lives may be preserved annually, by pursuing the method of cure laid down in the preceding inquiry ; for though many of the poor, while residing in their own houses, are deprived of those advantages which tend to mitigate the disease, and are subjected to such inconveniences, as cannot fail to increase its virulence ; yet, as not only the opulent are frequently visited with the distemper in its worst form, but also great numbers of the middle and lower ranks in life, who have large families of children, are better accommodated in their houses, and in general are more attentive to their domestic interests, than the former class of people ; these, or such as have it in their power to follow out the method of cure directed, will experience its salutary effects, in the preservation of many lives, which are now lost to their friends and the public ; therefore, altho' from the impediments

ments hinted respecting the poor, the reduction of deaths by small-pox, cannot be so extensive, it will nevertheless be very considerable.

Every scheme calculated to preserve the lives of individuals, or to increase population, is not only of private, but national advantage, and merits the public attention. The population of a country ought always to be an object with its legislature. It springs from many different sources, but in general runs parallel with improvements in the arts and sciences, and the internal police of a state. Science is most valuable, when it terminates, not in mere speculation, but in something that tends to the benefit of mankind. Population, in general, must increase, where the people are happy, not too much burdened, and the laws calculated to promote industry and sobriety among the poor: But if it were possible for the revenue of any state to be enriched by millions annually, by means which enabled the distiller to bring spirituous liquors to market at a very low price, the nation would suffer as much in point of popula-

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tion, as if celibacy among the poor was established by law.

Population has been considerably increased within this half century, by improvements in different branches of the healing art. The benevolence, as well as sound policy, in an especial manner, that respects the preservation of infant-lives; the establishment of lying-in hospitals, the judicious treatment of women in child-bed, the proper management of infants, and nursing them in the country*, cannot fail to save many lives. The modern improvements in the treatment of various diseases, are to be considered in the same point of light; nor should I omit the benevolent

* In the year 1767, in consequence of the humane suggestions of Mr Jonas Hanway, an act of Parliament was passed, obliging the parish-officers of London and Westminster, to send their infant-poor to be nursed in the country, at proper distances from town. Before this benevolent measure took place, not above one in 24 of the poor children received into the workhouses, lived to be a year old; so that out of 2800, the average annual number admitted, 2690 died; whereas, since this measure was adopted, only about 450 die in the workhouses.

*See Examination of Dr Price's Essay on Population,
by the Rev. John Howlett, A. B. p. 91.*

nevolaent exertions of the *Humane Society*, who have been the happy instruments of restoring life to great numbers of people of all ages, in almost every part of the kingdom. The author hopes, by a candid investigation of the several sources of mortality by small-pox, besides the one before mentioned, a large addition may be made to the number of preserved lives.

The great proportion of the human race that die in infancy, is a problem that well deserves the consideration of the learned. Half of all that are born in London, says the ingenious Dr Percival, die under two years of age *. This vast depopulation has been ascribed to different causes; it may be imagined, the delicate frame of infants renders them an easier prey to disease, than adults: But well nursed children, properly attended to, not too much crowded together, who enjoy fresh air, and whose food and exercise are suited to their years, are not so liable to diseases, as the latter. I much

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suspect

* Observations on Population, p. 57.

suspect this great waste of infant-lives, even in populous cities, arises from improper management: And by taking a review of many families in every sphere of life, who pay a strict attention to their children, from the first in the kingdom, we have a striking and encouraging example of the success attending parental duty, in the enjoyment of a numerous and healthy offspring: It is certain however, that a smaller proportion of infants die in the country, than in great cities and populous towns. The author last mentioned observes, that in Manchester, one half only die under five years of age; and at Royton, a country township, not far distant from Manchester, the number of children who die under the age of three years, are to the number of those born, only as one to seven.

When on this interesting subject, I cannot pass over the observation of a judicious and intelligent writer: ‘ If proper attention (says he) were always paid to choice of situation, to public, domestic, and personal cleanliness, to the introduction and circulation of fresh air, and

‘and some other circumstances, I am inclined to believe, that the largest cities, notwithstanding the many disadvantages inseparable from them, might be rendered nearly, if not altogether, as healthy as the healthiest of country parishes. I am led to this conclusion, from some observations upon the diseases and population of the city of Chester, made by the ingenious Dr Haygarth of that place, in the year 1774. According to this writer, the annual proportion of deaths in the six parishes comprehended within the walls of that city, is,

‘ In St Michael’s,	I in 50
‘ Olaves,	I in 55
‘ Bridget’s,	I in 66
‘ Martin’s,	I in 59
‘ Peter’s,	I in 61
‘ Cathedral,	I in 87
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‘ Average,	I in 61.

' The proportionable number of inhabitants that die annually in some country parishes of distinguished healthiness, is as follows :

' Pais de Vaud,	- - -	1 in 50
' Country parishes in Branden-		
' burgh,	- - -	1 in 45
' Others in Brandenburg,		1 in 50
' A country parish in Hamp-		
' shire for 90 years,		1 in 50
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' Average,		1 in $47\frac{1}{2}$ *

To the above sensible observations, I beg leave to add, that the waste of infant-lives in populous cities, and especially in the metropolis, is much owing to bad nursing. It is natural for every mother to suckle her own child, if the state of her health will by any means admit of it ; and for most part she is amply rewarded for this labour, by a more speedy recovery and an acquisition of strength.

But

* Howlett's Examination of Dr Price's Essay on Population, p. 10.

But when absolute necessity prevents this, a healthy young nurse is the only resource that ought to be adopted, which is infinitely preferable to what is called *dry nursing*. It is impossible, by the use of the most simple nutritive foods that can be contrived, to supply the place of the breast, nature's provision for the delicate frame of infants. Those that have been brought up by the spoon, in place of the breast, and especially such children as have been indulged with broths and other strong foods, as is practised by many, although the bad effects do not immediately appear, yet they suffer more from dentition, and the common infantile diseases, than children in general do, who have been properly suckled; by this unnatural diet, their blood being more inflamed, renders all the diseases to which they are incident, particularly the *small-pox* and *measles*, more violent and dangerous, and by this means the mortality among infants is greatly increased. This, therefore, we must consider as one source from whence the constant annual mortality originates.

Before

Before I proceed to the consideration of other sources, it will be necessary to bring some evidence respecting the extent of the mortality occasioned by small-pox, which will show of what importance it would be to the country, if it could be reduced, and shall afterwards mention the expedients that have been employed to obviate this waste of lives.

The attention of the public, has been frequently called upon in the course of more than half a century past, to the consideration of the great annual mortality by small-pox. Dr James Jurin, secretary to the Royal Society, as far back as the year 1722, the æra of inoculation, published in the transactions of that learned body *, a state of the London bills of mortality for 42 years preceding that period, with a view to shew the prodigious numbers that were annually cut off by what he calls the natural small-pox. That of 1000 infants, 386 die under two years of age, which is greatly above one-third of

* Phil. Transactions, No. 374. p. 213.

of the whole. He then deducts those which he supposes to die of other diseases, and shews, that if the whole bulk of mankind be taken at the age of two years, the eighth part will die of the natural small-pox ; and that of such as undergo the disease in this way, one in five or six, or two of eleven die.

These calculations are founded upon register evidence ; and that the numbers are not exaggerated, is manifest from the great deficiencies in the London bills ; these, and most of the bills of mortality through the kingdom, stand much in need of reformation ; and it is to be regretted, that the excellent hints which have been given by men of eminence in their profession *, have not been attended to, as they promise

* Several plans have been formed for improving the bills of mortality. See Dr Percival's Essays, Medical and Experimental, vol. ii. p. 244. See also 'the sketch of a plan for new modelling, and essentially improving the London bills of births and mortality, and equally well adapted for every great city.'

Observations Medical and Political, by William Black.. M. D.

promise to be of general advantage; both in a medical and political light.

The London bills do not afford a complete register of births and burials; as they now stand, the total annual deaths, as well as those specified under particular diseases, must fall considerably short of the truth, and consequently the calculations founded upon them, must be greatly under-rated.

The accuracy of Dr Jurin's calculations, is confirmed by Baron Dimsdale, who before he set out for Russia, procured the London bills of mortality for 32 years from 1736. Of this table, he says, ' I was surprised to find the number for those 32 years, tally so exactly with the observations made by Dr Jurin *.'

If we take these calculations in another point of view, we shall find the registered deaths greatly disproportioned to the number of inhabitants.

The ingenious Mr Wales, master of the Royal Mathematical school in Christ's Hospital,

* *Thoughts on General and Partial Inoculations,*
p. 14.

Hospital, eight years since, has determined the number of the inhabitants in London, in this manner: "Mr Maitland, by an exact survey in the year 1737, of the number of houses, found them to be 95,968. He thinks we shall not exceed the truth, if we allow that 4032 have been added to that number since his time, and if so, their present number is 100,000. That a medium number of $6\frac{1}{2}$ persons to each house, will give the number of inhabitants, viz. 650,000 *."

The Rev. Mr Howlett, is of opinion, and that founded upon good evidence, that the actual amount of the inhabitants of London, cannot be less than seven or eight hundred thousand †. And in a note at the bottom of the same page, he says, ' From the above detail, it must be extremely obvious, that by computing the inhabitants of London, from the present wretchedly imperfect bills of mortality alone,

* Enquiry into the present state of Population, p. 13.

† Examination of Dr Price's Essay on Population, p. 95.

'alone, we fall short of the truth considerably more than one-third, perhaps very little less than three hundred thousand souls.'

'But to prevent every exception, as I wish rather to keep below than to exaggerate numbers, I shall deduct 50,000 from Mr Wales's calculation, and so reduce the number of the inhabitants of London, to 600,000.' In order, therefore, to rouse the attention of the public to a matter of so much importance, let us extend our views of the havock made by small-pox, over the islands of Great Britain and Ireland, according to the preceding low estimate. If therefore the waste of lives by small-pox, be taken in the proportion of 2000 deaths to 600,000 inhabitants, and if we admit that Great Britain and Ireland contain ten millions of inhabitants, which calculation is likewise considerably under-rated; and upon the supposition that the same proportion of deaths prevail in these united kingdoms, the total annual loss of subjects, is somewhat above 33,333.

But as the above calculations are founded on the London registers, which have been

been shown to be so extremely defective, both in the births and burials, we shall find, that great as the total deaths by small-pox is, in proportion to the number of inhabitants, it falls considerably short of the truth. This will appear evident, by taking a view of some smaller towns, where the register of births and mortality have been more accurately attended to.

The town of Liverpool in Lancashire, for example, eight years ago, contained 36,000 inhabitants; of these, the late ingenious Dr Dobson has found, in the course of three years observation, that upwards of 200 die annually of the natural small-pox *.

The same author informs us, that a like proportion of deaths occurs in the town of Leeds, Yorkshire, which then consisted of about 18,000 inhabitants, whereof 100 die every year of the natural disease †.

In the year 1773, a new and accurate survey of Manchester was executed, when
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* Address to the inhabitants of Liverpool, September 1. 1781.

† Ibid.

the number of inhabitants was found to be 27,246. The annual deaths by small-pox, from 1769 to 1774 inclusive, was 589, which makes the average proportion of deaths for each year, somewhat more than 94 *.

The inhabitants of Chester, by the Rev. Mr Howlett's account in 1782, amounted to 14,713; and Dr Haygarth, from an accurate register observes, that 378 persons died of the natural small-pox, during the last six years preceding 1778, which makes the average proportion of deaths for each year, exactly 63 †.

Other towns might be specified, where the same proportion of deaths to the number of inhabitants nearly occur, which gives a more just and accurate view of the mortality by small-pox, than the calculations formed upon the London bills, *viz.* in place of 2000 deaths in 600,000 inhabitants, we shall more probably find the proportion

* Percival's Philosophical, Medical, and Experimental Essays, p. 4, 5.

† Haygarth's Inquiry, p. 149.

proportion of deaths by the accidental disease, to be as 2000 to 360,000, which justifies Mr Howlett's observation on the London bills, remarked p. 445. By which calculations, the waste of human lives by small-pox in Great Britain and Ireland, amounts annually to something more than *fifty-five thousand, five hundred and fifty-five.*

This view of the annual loss of lives to a nation, not only excites the feelings of humanity, but in a political light, demands the spirited exertions of the Legislature, and the hearty concurrence and assistance of all ranks who wish to preserve the lives of their fellow-creatures, and increase the population of their country. The saving of fifty thousand lives annually, is a permanent and increasing source of strength and riches to the nation; it is almost impossible to calculate by figures, the growing produce of so many preserved lives to the state, in the course of 20 or 30 years.

It is truly amazing in this enlightened age, wherein so much attention has been paid to the general police of the country, that the constant annual mortality by

small-pox, has been so little attended to ; this obvious neglect, must be ascribed either to an improper idea of the disease by accidental infection, considering it as desperate, or for most part irremediable ; or to an entire dependence on inoculation, as the sole means of obviating the vast depredations made by it.

The people of Great Britain, high and low, seem to consider the small-pox as a necessary and inevitable calamity, which can no more be prevented than a common fever, and therefore quietly submit to it as one of the unavoidable misfortunes of life ; but this is a false and mistaken view of the matter, originating from early prejudices, and these strengthened by vulgar and erroneous opinions, as well as by some common modes of speaking, which lead to consider it as a disease to which mankind are liable from certain states of the atmosphere, change of air, or seasons, violent exercise, &c. *. In the same way, we find it is termed by most authors, the *natural* small-pox, to distinguish it from

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* See the preceding Inquiry, p. 31. Note.

the disease induced by art; yet it is by no means natural to the human constitution. That the disease which goes under that name, or which is caught by accidental infection, has always been considered as highly dangerous, destroying a sixth part or more of those who are attacked with it, is proved not only from the registers of mortality, but by the united evidence of all physicians; but the particular treatment of it, recommended in the preceding Inquiry, and the examples there given, will shew that the cure of the worst cases of small-pox by accidental infection, may be more certainly effected, than that of most acute diseases.

Having established by undeniable evidence, the great and constant mortality arising from the disease by accidental infection, we shall next consider what means have hitherto been fallen upon, to check this waste of lives by a single disease.

Inoculation, together with the cool regimen, are the only expedients that have been employed to counteract the ravages of this disease; and from the small proportion of deaths that take place by this

mode of cure, compared with the great mortality that occurs by accidental infection, we might reasonably suppose the bills would assume a more favourable aspect, in regard to the annual deaths by this distemper. We shall enquire, whether this is the case or not. If it can be shown that the small-pox formerly destroyed one of six, but now from the numbers preserved by inoculation, and our improved method of treating the disease, it is found on a general average, to cut off only one in ten or twelve, this at once would determine the magnitude of the improvement.

The leading intention of Dr Jurin's calculations, was not only to shew his countrymen the vast havoc of lives occasioned by the accidental disease; but to give a comparative view of the great disproportion of deaths by inoculation. Both these positions, are indubitable facts; yet strange as it may appear, even since inoculation has become more general, and great numbers of lives preserved by it, yet the annual mortality has not been reduced.

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We shall first prove this fact, by a comparative view of the bills previous to, and since the æra of inoculation; and then shall endeavour to assign the most probable causes of this seeming difficulty.

Dr Jurin's state of the bills of mortality, is comprehended in two tables, the first beginning with the year 1667, and ending in 1686, containing twenty years inclusive; the second, from 1701 to 1722 inclusive, being twenty-two years, in all forty-two years. The intermediate fourteen years, between 1686 and 1701, he was obliged to leave out, because in the bills for those years, the accounts of small-pox and measles are not distinguished, as in the preceding and following years, but are joined together in one article.

The general average appearing from Dr Jurin's tables of forty-two years, is as follows:

F f 3	Total
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Total number of burials, 903,798.
 Dead of small-pox, 65,079, or 72 in 1000.
 Medium number of deaths for each of these forty-two years, about 1550 *.

I am enabled to give a state of the bills for forty-two years posterior to the æra of inoculation, *viz.*, from 1731 to 1772 inclusive, as collected by Dr Lettsom, in his excellent Medical Memoirs of the General Dispensary.

The general average from this table, is,

Total number of burials, 1,005,279.
 Dead of small-pox, 89,628, or 89 in 1000.
 The medium number of deaths for each of these forty-two years, 2134.
 Annual increase of deaths, 584.

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* Phil. Transactions, vol. xxxii. No. 374. p. 213.

An anonymous writer, quoted by Dr Lettsom*, whose observations gave occasion to his defence of inoculation, makes the following remarks upon a comparative view of the above tables:

"The æra of inoculation, is about the year 1722. In the first eight years from thence to 1731, the little ground which it had gained, and the care taken to prevent the infection from spreading, made, I suppose, very little alteration in the fatality of the disorder."

"In the twelve years from 1731 to 1742 inclusive, the average proportion of deaths by small-pox, is 74 in 1000; in the succeeding ten years, it is 83; in the next ten, it is 96; and in the last ten, when the disease and the method of treating it are supposed to be better understood than ever, it is increased to 109. Doth not this intimate connection between the progress of inoculation and the destructive increase of the small-pox, lead to a suspicion, that the one is, in some degree at least, influenced by the other?"

Baron Dimsdale carries on his calculation of thirty-two years, formerly mentioned, from 1768 to 1775 inclusive, being an addition of four years to his former table. He observes, "That if the last eight years of this table are divided, it will appear, that the deaths from small-pox in the first four years, are 8642; and that the medium for each of these four years, is 2160."

"For the last four years, the numbers are 10,179, the medium for each 2544. An increase, says he, that is truly alarming, and well deserving the attention of the public *."

The above calculations, founded upon authentic evidence, clearly shews the mortality by small-pox has not been reduced by inoculation; but rather since the æra of that practice, or soon after, there appears to have been a considerable annual increase of deaths. I have produced the opinions of two ingenious writers on that

Thoughts on General and Partial Inoculations,
p. 23. Note.

that subject, the one an opposer, the other a great promoter of inoculation, but both coincide in one judgment respecting an increased mortality.

I cannot indeed join in opinion with either of the above authors, in ascribing this increase solely to inoculation. It will be admitted by every medical person, that inoculated small-pox are infectious, and that even the mildest kind will propagate the most malignant species. But it ought to be considered, the number of inoculated persons through the kingdom, bear but a small proportion to those who undergo the disease by accidental infection. It is true, the above calculations respect the mortality of the metropolis; whether the same proportion of deaths occurs in the provincial towns, and extends over the country, I am not able to determine with any degree of certainty; but from the best information I can obtain, the mortality from small-pox in general, is noway lessened in those places, since inoculation was practised: And in different towns where the small-pox has been epidemic, the proportion of deaths has been even greater than in London.

I shall now endeavour to point out the causes, not only of the continuance of the mortality in the proportions it occurred before the year 1722, but likewise of the increase of it since that period.

i. One obvious cause of the continuance of mortality in the same proportion it occurred before the year 1722, is, that hitherto no attempt has been made to check the violence of the disease by accidental infection. No person will call in question, that the constant and great mortality arising from this disorder, originates from those who are infected accidentally; that a few die under inoculation, is allowed; but they are extremely few in respect to the former. Practitioners who adopt Sydenham's plan of cure, look on till the disease acquires such a degree of strength, that it overcomes the powers of nature, and resists all the efforts of art: Any advantage we can obtain over it, is in the beginning; and the method laid down in the preceding inquiry, of obviating the dangerous symptoms, and not suffering them to rise to the immoderate lengths they

they commonly do, is the most effectual method not only of mitigating, but of shortening the distemper; and of saving the patient. By attending to the course theré prescribed, we make no doubt that many thousands of lives may be preserved to their friends and the public; and was this method of treatment to be more generally observed through the kingdom, it could not fail to influence the bills of mortality, by making a considerable reduction of deaths under this disease.

2. The second cause of increased mortality is, that as the disease by accidental infection, is most numerous and fatal, without an attentive precaution, the contagion which, in such cases, greatly abounds, is readily carried off from the patient, by means of servants, and other attendants, and spread among the sound. Inadvertency and ignorance respecting the highly infectious nature of the disease, proves a daily source of spreading the distemper. In these bad cases, the opulent have generally too many attendants, the poor too many visitants; these, especially

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if much employed in executing different offices about the sick, such as raising them up, assisting in shifting their postures, changing their linen, &c. can scarcely fail to carry off some of the pus or serum in their clothes, disseminating the contagion wherever they go. In all cases, therefore, of malignant small-pox, the fewer hands employed about the sick, the less will be the hazard of spreading infection; and these ought to be warned against going into clean families, until they have aired themselves well, or changed their clothes.

3. A chief cause of the increase of mortality, since inoculation has been more generally practised, is the present unguarded manner of treating the mild disease, whether induced by inoculation, or accidental infection; this has, and continues to be, a source of destruction to thousands. Before the æra of inoculation, and even for a considerable time after, few physicians followed Sydenham, in applying the cool regimen, or cold air to their patients, in every species of the disease, they were confined to their chambers,

bers. As inoculation came to be more generally practised, and the mode of treating it more and more improved, the cool regimen, with the application of cold air, comprehended a material part of the cure.

The benefits resulting from this particular management of the inoculated small-pox, paved the way for treating the disease by accidental infection in the same manner; this undoubtedly was a high improvement, and rescued many miserable creatures from suffocation in their confined apartments; but the advantages hereby acquired to both sorts of patients, soon came to be of fatal consequence to their unprepared neighbours; as by an unreserved mixing of the diseased with the sound, the distemper could not fail to be propagated to a much greater extent, than when the patients were in a state of confinement: Of course, the mortality occasioned by small-pox, has kept pace with our improved method of treating that disorder, in so much that the increased deaths have totally obscured the vast number of lives preserved by inoculation,

which

which otherwise must necessarily have influenced the bills of mortality.

This increase of deaths by small-pox, has not been attended to so much as its importance demanded. Many hints have been thrown out from time to time, which have only been treated in a speculative way, but no effectual attempts made to remedy the evil. Surely the Legislature and people of Great Britain, who give the lead to all the other states of Europe, for attention to national interest, are not now to learn, that small-pox is as infectious as the plague, and its effects but too often equally fatal : Notwithstanding of which, we daily see infants carried about, and others walking the streets, both under the inoculated small-pox, and those by casual infection ; is it then any way surprising, that a more general spread of the contagion, and a consequent increase of mortality has taken place ?

It is much to be regretted, that many persons, who otherwise are possessed of the most tender feelings, when inoculation takes place in their families, appear to be so much absorbed in the safety of their own

own children, they seem to lose sight of that due regard we owe to the welfare of society, by neglecting to seclude the sick as much as possible, from intercourse with others, and employing few hands about them, till the risk of communicating infection is over. Could these persons be persuaded, that by their inattention, many of their fellow-creatures, whose habits render them unfit to meet the disease, are not only exposed to a dangerous distemper, but often to death, they would be more scrupulous in having the most remote concern in a matter of so much importance to the lives and welfare of so many individuals.

No reasonable plea can be alleged in favour of inoculated patients, or others, whatever kind of the disease they may labour under, being allowed to walk the streets of any city, town, or village, seeing, that every person liable to the disease, is exposed to infection, by a near approach to another under the mildest form of it. By this unguarded association, disease and death are scattered among the heedless and unprepared multitude.

tude. This unrestricted mixture of those that labour under such a contagious disease as 'the small-pox,' with the healthy inhabitants of any place, is repugnant to every idea of sound policy, and therefore, every well regulated community ought to exert their authority, in preventing this dangerous and wanton abuse of liberty.

Can it be alleged, in the favourable circumstances of a mild disease, that these street-airings are necessary to the preservation of life? No person of judgment will say so: Why then should they be allowed to expose others to a mortal disease? more especially, as patients of the above description, if they have no garden or back-ground, can receive every necessary advantage of cool air, at an open window, or the doors of their houses, which they can reap from walking the streets, and without the least hazard of infecting others.

But if regard for the preservation of the lives of individuals has no influence in checking a practice so hurtful to society, and at the same time so unnecessary to

to the patient's recovery ; if the police of cities and lesser communites do not see the propriety of watching over the safety of their inhabitants, the neglect of which has frequently brought sickness into many families, to the manifest prejudice of trade, manufactures, or agriculture ; it would be an act of sound policy, as well as of mercy, in the Legislature of Great Britain, to prohibit by law, an abuse so dangerous and destructive to society. *Salus populi lex suprema est.*

This impolitic abuse of liberty, in the promiscuous intercourse of the infected with the sound inhabitants, which at present takes place in every city and town in Britain, evidently appears to be another great source of mortality.

4. We had occasion to observe, p. 436, that population has been considerably increased within this half century, by improvements in different branches of the healing art. If some thousand infants, for instance, are annually preserved, by improved methods of management, it is easy to see how these will multiply in a

course of years. This annual increase of subjects, in the way the disease is treated at present, must add considerably to the increase of mortality, either in the event of accidental infection, or uncautious and unguarded inoculation.

Having shown, that although inoculation was originally intended to obviate the great mortality arising from the disease by accidental infection, and might reasonably be supposed to produce this effect, from the peculiar advantages attending that mode of practice; more especially from the vast disproportion of deaths that occur in this way, compared with the great mortality which accompanies the other disease. It appears, however, that inoculation has not answered this important end; but rather since it became more general, and the cool regimen universally employed, both in this, and in every other species of small-pox, that there has been an annual increase of mortality from that period.

We have attempted to point out the causes of this increase, and shall now consider the most improved plans, that have been

been devised for obviating those fatal consequences.

i. As *partial* inoculation *, in the way it is commonly carried on, has been found a considerable source of spreading the contagion ; plans have been formed in different towns, for a *general* inoculation of the whole inhabitants, infants and adults; at one time, who had not formerly undergone the disease ; and with much labour and assiduity this undertaking has been executed in different places with good effect. Baron Dimsdale has accomplished this plan successfully, not only in some smaller towns in the neighbourhood of Hertford, but also different times in the town of Hertford ; and the same has been executed in other considerable towns,

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* Of late, physicians have made a distinction between *partial* and *general* inoculation. *Partial*, is the mode in which inoculations are carried on at present in the metropolis, and all the capital towns of Great Britain, where every one who favours the measure, puts it in practice at his own conveniency. *General* inoculation supposes an agreement of the whole inhabitants to have their children, and all susceptible of the disease, inoculated in one day ; a measure which only can be practised in villages and small towns.

with success. The advantages arising from this plan are, that by insuring a mild disease to the inoculated, a small number only remain liable to the casual distemper ; and consequently, when the contagion is again introduced, it has but a few subjects to prey upon.

General inoculations, therefore, may be carried on with good effect, in villages and smaller towns, where most of the inhabitants are known to each other, and agree to have their children, or such as have not undergone the disease, inoculated in one day ; and though in the most favourable instances of general inoculations, a very few exempts may occur, who either will not receive infection, or may be deemed improper subjects for the operation ; yet as the far greater number pass through the disease in an easy way, it removes all future fears in regard to them. By this mode of treatment, the town or village may continue free from the distemper for several years, till, by increased births, or new settlers, recourse must be had to another general inoculation, which must be repeated at proper intervals.

But

But the great and almost insuperable difficulty attending general inoculations, is, that they cannot be carried into execution in large and populous cities, not only from want of unanimity in the measure, but on account of numbers.

Baron Dimsdale, one of the first promoters of general inoculations, admits, "that among the lower classes of people in the metropolis, as well as in other places, the voice of the generality is against inoculation."

A general inoculation in any town, supposes the concurrence of all sorts of people to the measure; yet, however general inoculation may be in any place, a greater or smaller number of exempts must always occur; sickness and other circumstances in families, will prevent some; several will prove improper subjects for the operation; and a certain proportion will be found unsusceptible of infection; according to the population of the place, young subjects will be born into it, while the inoculation is carrying on. It is necessary likewise to observe, that in executing the plan of a general inoculation, a suitable

provision is to be made for the support of poor families, during the inoculating period; and if the matter is properly conducted, a change of linen and clothes should be bestowed upon each of the inoculated who may stand in need, especially if many in the town remain uninfected; their old things ought to be well cleansed and aired, all infectious rags destroyed, and the exempts to be carefully watched, till all danger of infection is over.

It is not only from the want of unanimity that inoculation is rendered impracticable in the metropolis and other populous cities, but on account of numbers. Baron Dimsdale observes, "That the number of deaths by small-pox in London, in each of the years 1772, 1773, 1774, and 1775, on an average, was 2544." To suppose that one dies out of every six, who have the natural distemper, will be allowed a moderate estimate; it follows then, that the number of those who have passed through the disease in each of the four last years, will be 15,264. "And it must be taken into the account, that the annual recruits by births, will probably be about 20,000, besides

besides those that are continually arriving out of the country to seek employment *.”

To obviate in some measure the difficulties that would attend an attempt of this nature in London, and other populous cities, the Baron has proposed, “ by the aid of Parliament, to enlarge the inoculating hospital at Pancras, and to wall in the ground belonging to it for the accommodation of the patients. That parish-officers be obliged, by act of Parliament, to apply to the hospital for the admission of every man or woman, who should either on their own account, or on behalf of their children, express a desire of being inoculated, and on their being taken in, to supply each with two new shirts or shifts, and sign an obligation to provide decent new clothing for every one, on their receiving notice of their recovery and time of dismission, and also to give a small gratuity (suppose half a crown) to every person of the age of and to the parents of every

G g 4 child,

* Thoughts on general and partial inoculations, p. 44, 45.

child, on producing a certificate of their having behaved decently, and complied with the rules of the house, signed by the physician, it would probably be a sufficient inducement, and at the same time the fresh clothing would effectually prevent the spreading of the disease to others *.”

This certainly was a wise and good expedient, and well calculated to save a number of lives, and to prevent the spread of contagion ; but it cannot be considered in the light of a *general inoculation*, for as it only comprehended those *who expressed a desire*, that were to be received into the house, we may easily suppose the far greater number of poor would reject the well intended proffer, notwithstanding the advantageous inducements held out to them. The Baron’s benevolent plan, therefore, only gave opportunity to such as favoured the measure, to have their children inoculated, without the hazard of spreading the contagion among their neighbours. But if at the same time the opulent and every other class of people, inoculated their

* Ibid. p. 57. et seq.

their families in the partial and unguarded manner they presently do, the disease must still continue to spread, while those received into the hospital, and regulated according to the Baron's plan, would be saved, without doing an injury to others.

Dr Haygarth has superadded to occasional general inoculations, a plan for preventing the natural small-pox, which, with much diligence, has been carried into execution in the city of Chester, by a society of gentlemen, and supported by voluntary subscription ; for a more particular account of which, I must refer my readers to the perusal of his Inquiry, to which the proceedings of the society for the space of six years are annexed ; where the theory of the disease is accurately laid down, and illustrated with a number of well authenticated facts.

By the humane and persevering diligence of this society, the mortality of small-pox has been greatly reduced in that city. The Doctor observes, " Taking the whole period of four years, ending March 30. 1782, the small-pox has been fatal to 139, or 35 annually. If we deduct the above mentioned

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ed 16 and 58, who died during the interval, when the regulations were not executed, the total deaths would be only 55, or 14 annually; whereas, the annual average of deaths, by this distemper, for six years previous to the establishment of this society, was 63. Hence its fatality has been actually reduced to *one half*; and if we deduct the numbers who died during the two periods, when the regulations were suspended, to near *one fifth*, &c. *."

The evident success therefore of Dr Haygarth's plan, is the best recommendation that can be given of it, and clearly establishes the truth of the principle upon which this success depended, and is equally proved by the temporary suspension of the regulations he had formed for preventing the spread of contagion. As these rules are short, simple, and may be easily practised by every community desirous of preserving the lives of their own families, as well as of their neighbours; as they contain a summary of the plan of prevention, I shall take the liberty of transcribing

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* Inquiry how to prevent the small-pox, p. 201.

ing them for the benefit of those who are not possessed of Dr Haygarth's Inquiry :

" Mankind are not necessarily subject to the small-pox ; it is always caught by infection from a patient in the distemper, or the poisonous matter or scabs that come from a patient, and may be avoided by observing these

Rules of Prevention.

" I. Suffer no person who has not had the small-pox, to come into the infectious house. No visitor who has any communication with persons liable to the distemper, should touch or sit down on any thing infectious.

" II. No patient after the pocks have appeared; must be suffered to go into the street, or other frequented place.

" III. The utmost attention to *cleanliness* is absolutely necessary : During and after the distemper, no person, clothes, food, furniture,

furniture, dog, cat, money, medicines, or any other thing that is known or suspected to be bedaubed with matter, spittle, or other infectious discharges of the patient, should go out of the house till they be washed, and till they have been sufficiently exposed to the fresh air. No foul linen, or any thing else that can retain the poison, should be folded up and put into drawers, boxes, or be otherwise shut up from the air, but immediately thrown into water, and kept there till washed. When a patient dies of the small-pox, particular care should be taken, that nothing infectious be taken out of the house, so as to do mischief.

“ IV. The patient must not be allowed to approach any person liable to the distemper, till every scab is dropt off, till all the clothes, furniture, food, and all other things touched by the patient, till the floor of the sick chamber, and till his hair, face, and hands have been carefully washed, after every thing has been made perfectly clean, the doors, windows, drawers, boxes, and all other places that can retain infectious

infectious air, should be kept open till it be cleared out of the house *.”

The propriety of the above regulations, will appear evident to every one acquainted with the effects of variolous contagion, as well as the manifest advantages that must accrue to society from the observation of them ; yet, even in Chester, where in general the greatest attention was paid to this object, difficulties at times obstructed that society in the execution of their work. “ We will next, says Dr Haygarth, state the difficulties and the success of our endeavours to prevent the progress of the natural small-pox. The same people who refused inoculation, and they are a large proportion of the inhabitants, are fearless, or rather desirous that their children should be infected with the natural small-pox. It is with concern we remark, that in one part of the town (Cross Gun-entry, Forest Street), the inhabitants disregarding the inspectors exhortations, have purposely propagated the distemper, carrying the

* Ibid. p. 118, 119, 120.

the poison, and even the patients from one house to another without reserve. In consequence of this conduct, it spread through fifteen families, infecting all in this entry liable to it, and proved fatal to severals. In another quarter, the poor people allowed their children to have an unreserved intercourse with the infectious, &c. These two instances of irregularity, though very unfortunate, yet when contrasted with the numerous facts where the progress of the distemper was stopt by observing the rules, afford the clearest proof how useful the preventive regulations might become if properly observed *."

It will appear evident, that where a considerable number of the inhabitants of any city or town, refuse inoculation; or as happened in Chester, are such enemies to their own interest, and the safety of their families, as voluntarily to expose their children to infection, such conduct must necessarily be productive of fatal consequences to many; and even in large towns, where a general inoculation is proposed,

* Ibid. p. 198, 199.

posed, and many will not agree to it, though they may not be active in exposing their children to the infection, the danger of spreading the disease, without the greatest circumspection, will bear a proportion to the number inoculated.

Dr Haygarth observes, “ It is necessary, but painful to remark, that the present mode of partial inoculation, though highly beneficial to individuals, is on the whole pernicious to the community. Not more than twenty, or fifteen, or perhaps still fewer, are here annually inoculated, a number that cannot sensibly diminish the mortality of small-pox in so populous a town, but yet sufficient to propagate the disease, as many hundreds promiscuously mixed with them through the town, are incautiously exposed to infection. And in fact, many instances might be produced of the epidemical small-pox occasioned by inoculation in various places *.”

But are not these inoculations to be considered as strictly *partial*, when the measure is either refused or opposed by a
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* Ibid. p. 158, 159.

large proportion of the inhabitants? How almost inevitable in such cases, to prevent a spread of the contagion? And if this consequence did sometimes occur at Chester, where the rules of prevention were so pointedly enforced, what havoc of lives must take place in other towns, where partial inoculations are carried on, and no rules observed, nor restrictions imposed for the safety of the non-inoculated?

By a review of the above plans for rendering inoculation more beneficial to mankind, it appears they are still incomplete, and have failed in one of their chief intentions, the reduction of mortality. It has been shown, that partial inoculations, in the unguarded way they are carried on in all the great towns of Britain; by multiplying contagion, must necessarily increase mortality. That general inoculations can only be successfully practised in villages and small towns; but can never be carried into execution in the metropolis, or other populous cities. The success attending Dr Haygarth's plan of prevention, shews it may be of the greatest use in the preservation

servation of many lives, in places where inoculation can be rendered general, but otherwise must be frequently subjected to the inconveniences attending partial inoculations.

In this state of matters, there remains only one expedient, as yet unattempted, which affords any rational prospect of obviating the above inconveniences, and that is, by simplifying Dr Haygarth's plan, adopting his rules of prevention, without annexing inoculation to it.

I shall lay before my readers, the leading principle upon which this plan is founded, and they will judge how far it may be carried into execution, with any probability of success.

The plan of *simple prevention* is founded upon a property peculiar to most foreign contagions, that they are extremely limited in respect to their active influence, or power of propagating infection. This is a fact known in the experience of every attentive practitioner. The contagion of small-pox, measles, jail-fever, and even of the plague itself, being emitted from a body, or from fomites in which the infec-

tious particles are lodged, daily observation shews, that contact, or a very near approach to the source of infection, is absolutely necessary to propagate the disease. The reason of which appears to be, that these contagious effluvia, the further they escape from the source of infection, being more and more separated and resolved by their diffusion in the common atmosphere, their hurtful properties are weakened, and rendered incapable of communicating infection.

This view of diffused contagion, ought to allay the groundless fears entertained by many, respecting a variolous, or even a pestilential atmosphere. In proof of this, many examples occur in Constantinople. When the plague rages in that city, the Greeks who live next door to the infected houses of the Turks, and only separated from them by a thin partition, are seldom or never seized with the distemper, merely by avoiding communication with their neighbours. And the people who dwell near a small-pox, or inoculating hospital, are never infected by breathing the air of those places. However epidemic, therefore,

therefore, small-pox may be in any city or district, it is impossible the atmosphere of such places, can be so much loaded with the contagious particles, as to propagate the distemper. Certain states of the air, may prove an occasional cause of increasing or aggravating the disease, where it has already taken place; but no state of the common atmosphere, can ever prove the immediate cause of infection.

Hence we see an evident distinction between small-pox and some other foreign contagions, and such endemic epidemic diseases as originate from certain conditions of the air; in those, by proper precautions, we can prevent their access into a clean place, or if at any time they are accidentally brought into it, we have it in our power to stop the progress of the infection; but as these solely depend upon the state of the atmosphere, we can neither prevent their access into any place, nor check their progress; for not being under the control of human wisdom, they are not to be evaded by the best policy.

There is a certain aptitude in contagious effluvia of every kind, to adhere to

H h 2 substances

substances of a soft and porous nature, and they appear in a peculiar manner to be attracted by animal substances, such as wool, silk, feathers, hair, &c. or even the bed-clothes of the sick; these may be so much impregnated with contagious particles, especially when close shut up, and neither washed nor exposed to the air, that upon exposure, they readily communicate infection, and by means of these fomites, the contagion of the plague and small-pox, has been transmited from one part of the globe to another: The history of different contagions, traced to their source, evinces the truth of this observation. The plague has been frequently imported into this island, and other parts of Europe, in bales of merchandise. In the year 1718, the tribe of Hottentots on the Cape of Good Hope, were almost extirpated, by means of some linen sent on shore to be washed from a Dutch East India ship, where a few boys had the small-pox on the passage, but were then perfectly recovered *. The same dismal event happened to some American

* Mead de Variolis et Morbillis.

rican Indians, by means of the present of an old blanket made to one of them, by which a whole tribe was nearly destroyed *.

It has been supposed, that even in inoculated small-pox, “ The disease may be spread by the intercourse of visitants, trades people, washer-women, servants and others ; and in a mild state of the disease, the frequent excursions of the sick by way of airings, and often in hired carriages of various kinds, contribute greatly towards spreading the infection. It would perhaps be deemed a designed omission, if the inoculators were not also supposed to be of the number of those that contribute to spread the disease †.” Too much precaution cannot be used by every family where the small-pox is, to prevent the spread of that contagious distemper amongst their unprepared neighbours ; but unnecessary restrictions will always prove unfavourable to any general plan of prevention that can be proposed. We have the most

H h 3 unquestionable

* Lind on Fevers and Infection, p. 295, 296.

- Thoughts on General and Partial Inoculation, p. 24.

unquestionable evidence, that the near approach of a person susceptible of the small-pox, to another under the mildest form of it, will propagate infection, and may, and often does propagate a very bad species of the disease. But it is equally certain, where the assimilation has been moderate, and of consequence the pustules few, there is little or no danger of the contagious particles adhering in such quantities to the clothes of servants, visitors, or inoculators, as will communicate infection to others.

From this last observation, we may naturally suppose there is a greater danger of spreading variolous contagion, in proportion to the quantity of contagious matters lodged in a patient ; this, indeed, we have considered as one of the causes of increased mortality, and shown; p. 459, by what means the contagion, in such cases, may be carried off, and disseminated amongst the unprepared, and likewise what precautions are necessary to obviate this error. At the same time, there is reason to believe, that in all the worst cases of small-pox, or such where contagion abounds most, the patient being confined
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to his chamber, if not to his bed, a dread of the severity of the distemper, prevents his having so many visitors, as those under a mild disease; whereas, in this last case, from the prejudices of mankind, from the liberty the patient is capable of enjoying, both in the house and street, and no sort of separation attempted between the infected and the sound; it appears highly probable, the small-pox has spread more by means of the mild disease, especially since the cool regimen has been universally employed, than by the most malignant cases of small-pox.

If what has been observed upon the limited nature of variolous contagion, is admitted, it must evidently appear the distemper can only be communicated by contact, or a near approach to the source of infection; in which case, the rules of prevention must naturally occur to every person, and may, with very little inconvenience, be reduced to practice by every family and community, of which the following is an abridgment:

1. Suffer no person liable to the distemper, to enter the house where it is, and far less the chamber of the sick.
2. Let none of the family who have not formerly undergone the disease, associate with the infected.
3. However mild the disease may be, the sick ought never to be permitted to walk the streets, and expose others to infection.
4. Destroy all useless infectious rags.
5. Let no linen, or whatever else that has been used or handled by the sick, be carelessly scattered about, or sent to another family where any are liable to the disease.
6. All the linen, &c. used by the sick, ought to be immersed in a pail of water, and afterwards washed out and well aired.
7. Cleanliness

7. Cleanliness in general, is of the greatest use in pursuing the preventive plan.

8. When the distemper is over, the chamber to be washed, and every thing in it exposed for some time to the air. For more particular directions, see p. 475, et seq.

According to the present state of small-pox, every species of the disease, whether induced by art or accident, without the greatest precaution, must necessarily multiply contagion, and of consequence mortality. It therefore appears an evident proposition, if we would wish to reduce the mortality of that distemper, that we should first of all reduce the contagion from whence the mortality originates ; and this end, in a great measure, seems likely to be obtained, by the plan of simple prevention, which is intended to check the spread of the disease, upon its first appearance in any place ; this will be best illustrated by a familiar example. When at any time the contagion has been brought

brought into a clean town or village, and one person only is infected; by unguarded intercourse with the sound inhabitants, the disease may be spread to every individual in the place liable to it; whereas, if the above rules are strictly attended to, the contagion will proceed no further. But, as frequently happens, if upon an alarm of small-pox being in a town, though only in a single family, and one or more of the inhabitants are induced to inoculate their children, from a dread of their catching the disease accidentally; and if according to the common mode, no precaution is used for the safety of others, the disease, in all probability, will spread through the place, and infect every one who has not formerly undergone it, and may prove fatal to many.

The simplicity of this plan may serve to discredit it in the opinion of some, to me it is a recommendation, more especially, as every other method of reducing the mortality has been found ineffectual, and that there seems to be nothing else left to do, in order to attain this important end. But though the plan of prevention

tion may be disapproved by some, it will probably meet with the approbation of those who have long entertained prejudices against inoculation. From ignorance, or disbelief of the limited nature of variolous contagion, it will be difficult to convince some men, more especially the common people, of the truth of the principle upon which the plan is built, or, that exemption from a disease so fatal to thousands, should depend upon a cause so trifling, as merely avoiding a near approach to the contagion. The only hope is, that if the people in general can be brought to put the rules in practice, the experience of their efficacy, will afford a demonstration to their senses, of what at first they could hardly be brought to believe; and in carrying the preventive plan into execution, one beneficial consequence must necessarily take place, *viz.* that as by this means, the contagion being gradually lessened and reduced, the danger of infection becomes every day less frequent.

I shall now mention some objections that may be made to the preventive plan:

1. However

1. However long we may successfully prevent the small-pox, yet the dread of exposure to the disease at a future period, will prove a source of disquiet to some, and a strong objection to the preventive plan.

Persons of an anxious disposition, or such as have a natural dread of the distemper, ought to inoculate their children at a proper time, but always under the restrictions formerly mentioned, as none have a right in pursuing the means of their own safety, to endanger that of their neighbour's. But to such as persevere in observing the rules, it is impossible they can catch the distemper; and the more universally these are practised, the contagion will be more effectually reduced, and, as hinted above, the hazard of infection will be daily lessened; the author being persuaded, that if half the pains was taken for a few years, in extinguishing the contagion after this manner, that has been taken in multiplying it, the disease itself, and consequently the hazard of infection by it, would be far less frequent in this, and in every other country.

2. It

2. It must appear a material objection to the plan of prevention, that though by means of it, whole families of children may be preserved from infection; yet when these children grow up, and many of them obliged to repair for service to the metropolis, and other great provincial towns, which are seldom or never free from the contagion, they may catch the disease at a time of life, when it might prove more dangerous than if they had undergone it in infancy.

This objection is weighty, but it is magnified, as it stands connected with the present state of small-pox in Britain. The objection, however, in itself, serves to point out a material improvement, that in every place ought to accompany the plan of prevention. Young persons repairing to the great towns in search of employment, especially those who have been carefully guarded against accidental infection in the preceding years of their life, will be cautious of rushing into the jaws of hazard, by entering into any house or chamber where the small-pox is; their danger of infection, will not so much arise from

from this, as from meeting persons under the disease in the streets, and other frequented places. Hence the plan of prevention can never be carried on successfully, unless it is supported either by a law of the state, or the municipal laws of every great town, strictly prohibiting all under the small-pox, of whatever kind, from walking, or being carried about the streets, or other places of public resort. This regulation, I have formerly observed, would prove a great means of preventing accidental infection, and consequently serve to reduce the annual mortality; but when this salutary law is conjoined to the plan of general prevention, it must prove a considerable means of reducing the contagion itself, and of course rendering infection far less frequent.

3. It may be objected, that the plan of prevention can no more be put in practice in the metropolis, and other populous cities, than general inoculations can be carried into execution in such places.

I have formerly given the reasons why general inoculations can never be carried

on

on successfully in populous cities, *viz.* not only from want of unanimity, but on account of numbers. When the plan of prevention comes to be understood by the common people, it will be more readily adopted by the generality, especially those who are prejudiced against inoculation; and it is to be hoped, that even the advocates for that measure, upon observing the powerful efficacy of the preventive plan, will, in time, give it a preference, as exempting them altogether from a disease, which is always accompanied with some hazard.

The chief difficulty lies in properly regulating the vast numbers, who in different seasons lie under the small-pox in the metropolis, and other great cities. In small towns, where the disease only invades a few families, the rules of prevention are applied with the greatest ease and certainty of checking a further spread of the contagion; but in cities where some hundred families are under the disease, they are not so easily regulated. The best method of removing this difficulty, if the preventive plan was to meet with approbation,

bation, would be to subdivide each parish, according to its extent, or number of sick, into more or fewer parts, and to give the inspection of each part, to a proper parish-officer, warranted to see the rules put in practice; and in the event of a bad disease, authorised to call in the assistance of a neighbouring surgeon or apothecary. In this way, concerning which I have only given general hints, which may be considerably improved, I apprehend the spread of contagion, and consequently of mortality, may be greatly checked, even in the metropolis.

Whether the preventive plan may ever appear in that light of importance, as to be brought into general practice, in this or any of the other states of Europe, it may, nevertheless, prove of great advantage in particular circumstances; for example,

When small-pox breaks out in a ship of war, when fitting out, the patient ought to be immediately sent on shore, with all his clothes, either to a small-pox ward, or separate apartment in the hospital, and his hammock ought to be dipped some time

time in the sea, and afterwards well scrubbed and dried. ~~I have~~ ^{I have} observed this method to be
But if the distemper does not appear till the ship is at sea, the greatest precaution is necessary to prevent a spread of the contagion; this I have had an opportunity of witnessing, when every man liable to the disease on board was infected. Had the nature and influence of the contagion been then as well understood as it is now, by applying the rules of prevention to the first seized with the disorder, the infection would have proceeded no farther, by which many would have been preserved from a severe disease, with bad accommodation, and the death of four or five good seamen prevented. When a case of this kind occurs, which it sometimes does in time of war, when from necessity, a number of young landsmen, as they are called, are taken on board to make up the ship's compliment; the patient ought to have a birth assigned him, in the most convenient and airy part of the ship, and attended night and day, by keepers or sentinels, who have already undergone

undergone the disease, and may prevent others liable to it, having any intercourse with him. Upon the first appearance of the disorder, the ship's company ought to be mustered, and the question put to every man, whether he has had the small-pox? and all who have not undergone the disease, discharged from going near the infected person, for at least fourteen days after his perfect recovery, when himself, clothes, and bedding, ought to be well washed and aired. By this method, the disease may be prevented from spreading to a second person. In the event of death, his clothes, and every thing he has had occasion to use, ought to be sewed up in the hammock, and consigned to the sea.

In the same way, the disease may be prevented from spreading in a camp, in barracks, hospitals, boarding-schools, or other numerous families.

Thus in different emergencies, the plan of prevention may be of great utility, both in the public service, and private life; and a proof of its efficacy in preventing the spread of contagion, may easily

easily be obtained in any village, small town, or island, by applying the rules of prevention, at any time when the disease makes its appearance in any of these places.

F I N I S.

E R R A T A.

- P. 145, 146, 147. headline, *for* Contiguous, *read* Confluent.
 P. 300. *for* Chap. x. *read* Chap. xi.
 P. 405. l. 10. from the foot, *for* p. 322, 323. *read* p. 384, 385.

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